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Membership is open to anyone interested in its aims: conservation of all native plants; education of the public to appreciate and preserve plant life; sponsorship of research and publication on the plant life of the State and the Great Lakes area in general, both in the USA and in Canada; sponsorship of legislation to promote the preservation of Michigan's native flora; establishment of suitable sanctuaries and natural areas, and cooperation in programs concerned with the wise use and conservation of all natural resources and scenic features.

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THE CHAMPION TREES AND SHRUBS OF MICHIGAN

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This paper is a revision of "The Champion Trees and Shrubs of Michigan" published in *The Michigan Botanist* 36: 3–29. 1997. Many changes have occurred in the lists of Champion Trees and Shrubs in the five years since that paper was published. Additional species have been included, new champions have been found and regrettably some of our fine former champions have been lost to ice and wind storms, lightning strikes, road commissions, and development.

The Big Tree Program of the Michigan Botanical Club started soon after the organization of the club in 1941. Paul Thompson, affiliated with the Cranbrook Institute of Sciences, became the state's Big Tree Coordinator and served in that capacity for over forty years until his death in 1994. Many individuals, mostly Michigan Botanical Club members, worked with Paul over the years as he set about discovering, measuring, and recording Michigan's biggest trees and shrubs. Champion size trees were reported to *American Forests*, nominated for National Champion status, and subsequently listed in the "National Register of Big Trees," issued every two years by *American Forests*.

I began my work with Paul Thompson in 1991. We had decided to prepare a series of short articles for publication in *The Michigan Botanist*. Paul described trees he thought I could find, gave me careful directions to their locations, and I began a new set of measurements. About two dozen trees had been located and re-measured before his death in 1994. The series of articles in *The Michigan Botanist* has continued to grow. As of now, 34 have been published, another two have been submitted, and four more are in preparation. These articles are described in the next section of this paper and listed in Table 1.

Paul Thompson had an amazing ability to instantly recall a great many details about each champion tree or shrub and its location. He enjoyed telling me whether the approach road was paved or gravel, whether the farmhouse the tree stood beside had bay windows or not, and, oh yes, "There is a woodpecker hole on the northeast side of the trunk." When I learned of his death, I feared that all of this had been lost. Much of it has, of course, been lost, but not all. Through the kindness of his family and the efforts of friends, George and Kathleen Thomson, his meticulous and voluminous notes were preserved. The notes contained information on 3734 individual trees and shrubs in Michigan. In some cases the measurements were exact and the locations were precise. In other cases, measurements were approximations and locations were described only in cryptic hints.

It took two-and-a-half years to sort through Paul Thompson's records. In addition to *The Michigan Botanist* series of articles, the 1997 paper updating Paul's

1994 list of champions was published by me (Ehrle 1997) as a result of that work. The four or five largest of each species have been entered into a computer database. There are now 953 individual trees and shrubs in the database. It will not be published, as it is impossible to determine the accuracy of some of the entries. The 227 items in the 1997 list of champions and the 251 items in this paper are subsets extracted from the larger database. This list contains information on 219 current and former State Champions, including 48 National Champions. National Champion status is based on a point system in which the girth in inches at 4½ feet above the ground is added to the height in feet and ¼ of the crown spread in feet. State Champion status is based on girth alone.

Paul Thompson and the people who worked with him discovered most of these champions. Through their efforts, Michigan had more recorded National Champions standing within its borders than many other states. This paper is dedicated to the memory of Paul Thompson and salutes his outstanding contributions to Michigan botany and to the Michigan Botanical Club.

THE MICHIGAN BOTANIST BIG TREE ARTICLES

With the agreement of the editor of *The Michigan Botanist* and the endorsement of the Michigan Botanical Club Board of Directors, a series of articles on Michigan's big trees was started in *The Michigan Botanist* in 1992 (see Table 1).

Each article provides a description and illustration of the species along with the location of Michigan's champion, directions on how to reach it, and its most recent measurements. The third paper in this series reports on a tree that has since been lost in a storm. Reprints of these articles are available from me at the address above.

TABLE 1. Michigan Botanist Big Tree Articles thus far published

Article # and species	Michigan Botanist Reference	
1. Populus balsamifera L. Balsam Poplar	31: 112–114	(1992)
2. Populus tremuloides Michx. Quaking Aspen	32: 232–234	(1993)
3. Quercus bicolor Willd. Swamp White Oak	32: 266–268	(1993)
4. Pinus banksiana Lamb. Jack Pine	33: 19–21	(1994)
5. Pinus resinosa Ait. Red Pine	33: 69–71	(1994)
6. Magnolia acuminata (L.) L. Cucumber Tree	33: 91–93	(1994)
7. Quercus alba L. White Oak	33: 125–127	(1994)
8. Quercus rubra L. Red Oak	34: 79–81	(1995)
9. Ginkgo biloba L. Ginkgo	34: 133–134	(1995)

(Continued)

TABLE 1. Continued

Article # and species	Michigan Botanist Reference	
10. Tilia americana L. Basswood	34: 141–143	(1995)
11. Fraxinus pennsylvanica Marsh. Red Ash	34: 144–146	(1995)
12. Morus rubra L. Red Mulberry	34: 147–149	(1995)
13. Quercus macrocarpa Michx. Bur Oak	35: 27–29	(1996)
14. Gleditsia triacanthos L. Honeylocust	35: 51–53	(1996)
15. Populus deltoides Marsh. Cottonwood	35: 54–56	(1996)
16. Salix nigra Marsh. Black Willow	35: 96–98	(1996)
17. Pinus nigra Ait. var. austriaca (Hoess.) Aschers. Black Pine	35: 99–101	(1996)
18. Fraxinus americana L. White Ash	36: 119–120	(1997)
19. Acer platanoides L. Norway Maple	36: 121–123	(1997)
20. Ostrya virginiana (Miller) K. Koch Ironwood or Hop-hornbeam	37: 14–16	(1998)
21. Castanea dentata (Marsh.) Bork. American Chestnut	37: 59–61	(1998)
22. Fagus grandifolia Ehrh. American Beech	37: 62–63	(1998)
23. Acer saccharum Marsh. Sugar Maple	37: 117–119	(1998)
24. Taxodium distichum (L.) Rich. Bald-cypress	38: 42–44	(1999)
25. Sequoiadendron giganteum (Lindl.) Buchholz Giant Sequoia	38: 45–47	(1999)
26. Acer pseudoplatanus L. Sycamore Maple	39: 51–52	(2000)
27. Prunus pensylvanica L.f. Pin Cherry	41: 13–14	(2002)
28. Salix matsudana Koidzumi f. tortuosa Rehder Corkscrew Willow	41: 15–17	(2002)
29. Betula papyrifera Marsh. var. cordifolia (Regel) Fern. Mountain Paper Birch	41: 94–96	(2003)
30. Betula pendula Roth European White Birch	41: 97–99	(2003)
31. Acer saccharinum L. Silver Maple	41: 100–103	(2003)
32. Platanus occidentalis L.	41: 104–106	(2003)
33. Picea abies Norway Spruce	42: 47–49	(2003)

HOW TO MEASURE AND REPORT A BIG TREE

State Champion trees are determined by measuring the girth or circumference of the trunk, in inches, at 4½′ above the ground. National Champion determination is based on a point system with the number of points obtained by adding the circumference of the trunk, in inches, 4½′ above the ground to the height in feet and ¼ of the average crown spread in feet.

The circumference of the trunk is usually the easiest measurement to make. A tape can be run around the trunk at 4½′ above the ground or a string can be used if a long tape is not available. In situations where the tree grows on a steep slope there may be some uncertainty as to just where on the trunk 4½′ comes. In these cases, it is best to measure the circumference at 4½′ on both the up-slope and down-slope sides and average them together. If a tree trunk branches below 4½′, the circumference of only the largest branch should be measured. The height is best determined by using an inclinometer, Abbey Hand Level, transit, or other instrument for measuring the angle formed by sighting the base and top of the tree. If this angle is measured 100′ from the tree a table of tangents can be used to convert the number of degrees of the angle to the height of the tree in feet. If instruments to measure the angle are not available you can use a straight stick and back away from the tree to measure its height. Hold the stick at arm's length as you back away from the tree. When you are far enough from the tree that you can sight over your hand holding the stick to the base of the tree and over the top of the stick to the top of the tree you are at a distance from the tree equal to the height of the tree. For this to be accurate, you must be on ground level with the tree base.

There are several other more or less reliable methods of measuring the heights of trees. If a tree stands alone and casts a shadow on a sunny day, the length of the shadow can be measured and compared to the shadow cast by a yardstick. For instance, if the yardstick (3′) casts a 6′ shadow (each foot of the yardstick casts a 2′ shadow) and the tree casts a 120′ shadow, the height of the tree is 60′. Another method that works quite well is to have someone of known height, say 6′, stand at the base of the tree. While you back away from the tree holding a yardstick at arm's length you will reach a point where you can measure the apparent height of the person standing at the tree base and the apparent height of the tree from that point. For instance, if the 6′ person measures 6″ on the yardstick (1″ for each foot) held at arm's length and the tree measures 30″, the height of the tree is 30′. For trees standing in a mixed woods where it may be difficult to be sure which top branches belong to which tree and shadows and long lines of sight are not available, the use of an Abby hand-held level, transit, or other instruments may be necessary. In those cases, County Extension Agents, county or city foresters or other experienced person may be of help.

The average crown spread can be measured by examining the farthest extent of the crown on all sides of the tree. You then measure the tip-to-tip distance across the largest crown length. Do the same across the shortest tip-to-tip crown distance and average the two. The average is known as the average crown spread.

To report a big tree, first determine the identity of the tree. It will not be sufficient to say, "It is some kind of oak," unless you are prepared to send leaves, twig

tips and acorns in with your measurements. Personnel from your County Extension Service or a nearby college or university may be able to help you confirm the identity of the tree. Second, take the measurements described above. If this is not practical, at least measure the girth in inches at 4½′ above the ground. Finally, send the name of the tree, its exact location, and measurements to the State's Big Tree Coordinator—for the near future, the author of this paper. This will insure the inclusion of the tree in the state's Big Tree Inventory. It is hoped that GPS records can be included to more accurately indicate the location. You can always find out who the big tree coordinator is for any state in the country by contacting the Director, National Big Tree Program, American Forests, PO Box 2000, Washington D.C. 20013.

COMMENTS ON THE LIST OF THE CHAMPION TREES & SHRUBS OF MICHIGAN

Much of the information in the list of the champion trees and shrubs of Michigan (Table 2) is self-explanatory. Table 3 presents a list of the abbreviations used. Table 4 presents an alphabetical list of the same trees and shrubs by common names to facilitate finding a tree or shrub when only the common name is known. Table 5 presents a list of these same trees and shrubs arranged by county.

The scientific and common names used in these lists are those regularly used in books and manuals treating the plants known to be growing in the Great Lakes area. Important among these are Barnes & Wagner (1981), Voss' three volumes on the flora of Michigan (Voss 1972, 1985, & 1996), Gleason & Cronquist (1991), Dirr (1983), and Rehder (1940). In most cases there is little uncertainty about what name to use. A few, however, are problematic. Most of these are related to hybrids between species or a difference of taxonomic opinion as to whether the varieties of a species should be recognized as separate species. Unfortunately, both of these types of problems occur in our most common trees, oaks and maples.

The measurements are given as inches at 4½′ above the ground for girth and as feet for height and average crown spread. In most cases these measurements were made in accordance with the specifications given above. Periodically, when a tree is re-measured it is found to have a lesser height or average crown spread. This is usually due to a loss of branches caused by a storm since the earlier measurements were made. The date of the most recent measurement is given in the last column of Table 2. Some of these trees haven't been re-measured in many years. All interested parties are urged to join the search for them and to report their current measurements.

The Town column of Table 2 may indicate the city in which a tree or shrub exists or, where more useful, the name of the township is given. For some entries, a state park may be listed or the name of a lake given if it is likely to be helpful in finding the location.

Where more than one tree of a given species is listed, it is likely due to the designation of co-champions or situations where the state and national champions are different trees. There are also cases where only the girth is known for recently discovered trees. In these cases the current or past champions, for which complete data are known, are also listed.

TABLE 2: The Champion Trees and Shrubs of Michigan

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Abies balsamea Balsam Fir	208	84	116	33	Ontonagon: Porc Mt St Park	Gov't Pk Tr	1961
Abies concolor White Fir	189	88	92	37	Ionia: Saranac	South side of cemetery	1996
Abies fraseri Fraser Fir		45			Wayne: Northville		2002
Abies nordmanniana Nordmann Fir		28			Washtenaw: Ann Arbor		2002
Acer campestre Hedge Maple	165	100	54	45	Kalamazoo: Gull Lake	Gull Lake-Kellogg Biological Station	1989
Acer ginnala Amur Maple	113	72	30	44	Washtenaw: Ann Arbor	#1 Regent Place	1995
Acer griseum Paperbark Maple	71	37	27	28	Washtenaw: Ann Arbor	925 Aberdeen	1995
Acer negundo Box Elder	348	219	100	117	Livingston: Cohoctah	North of Howell	1980
Acer negundo Box Elder		252			Washtenaw: Milan		2002
Acer negundo Box Elder ***NCh***	356	214	110	127	Washtenaw: NW of Milan	Saline & Mooreville Rds	1972

Acer nigrum Black Maple ***NCh***	348	198	118	127
Acer pensylvanicum Striped Maple	114	44	59	43
Acer platanoides Norway Maple	272	173	80	75
Acer pseudoplatanus Sycamore Maple	178	111	53	54
Acer rubrum Red Maple	375	234	120	82
Acer saccharinum Silver Maple	477	347	115	61
Acer saccharum Sugar Maple	323	225	78	80
Acer saccharum Sugar Maple		276		
Acer spicatum Mountain Maple ***NCh***	99	33	58	31
Aesculus glabra Ohio Buckeye	253	134	104	58
Aesculus hippocastanum Horse-Chestnut	275	165	93	69
Aesculus octandra Yellow Buckeye	179	102	62	60

Allegan: Thomas & Jackson Sts	W bank of Kalamazoo River	1968
Marquette: Huron Mt Club	S Rush Lake Trail	1973
Leelanau: Empire	Fred Taghon residence, Front St	1995
Manistee	Lk Bluff- 2890 Lake Shore Dr, Audubon Ctr	1995
St. Clair: St. Clair	6700 Puttygut Rd	1984
Luce: Newberry	McPhee Landing	2002
Manistee: E of Bear Lake	Big 4 Rd	1995
Montcalm: Carson City		2002
Houghton: 2 miles SE of Beacon Hill	T55N, R35W, section 32, SE ¼ NW ¼	1979
Lenawee: Adrian	River, E of Maple, 420 N Maple	
Wayne: Grosse Isle	24356 E River Rd	1963
Kalamazoo: Gull Lake	Kellogg Biological Station	1989

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Aesculus pavia Red Buckeye ***Nch***	168	91	64	52	Kalamazoo: Vicksburg	Prudential Nursery	1965
Ailanthus altissima Tree-of-Heaven	222	162	50	40	St. Clair: Maryville	Electric & Sturgis Rd	1988
Ailanthus altissima Tree-of-Heaven		180			Monroe: Milan		2002
Alnus glutinosa Black Alder	161	84	66	45	Wayne: Trenton	Elizabeth Pk E bank of channel	
Alnus rugosa Speckled Alder ***NCh***	118	38	66	56	St. Clair: Avoca	4238 Bricker	
Amelanchier arborea Downy Serviceberry	161	79	63	74	Barry: 4 mi NE of Cloverdale	6 mi S of Hastings, 425 Pritchardville	1983
Amelanchier laevis Allegheny Serviceberry	122	69	42	44	Leelanau	S of Maple City, SR 72-Sect 35	1963
Amelanchier sanguinea Roundleaf Serviceberry	62	16	38	30	Keweenaw: Copper Harbor	M-26 near Ft Wilkens	1968
Aralia spinosa Devil's Walking Stick	63	19	36	30	Oakland: Bloomfield Hills	Cranbrook Inst Sci	1973
Aronia melanocarpa Chokeberry	24	5	18	5	Oakland: N Milford	Highland	1958

Asimina triloba Pawpaw	91	35	48	32	Macomb: S of Utica	Dodge Pk #8	
Betula alleghaniensis Yellow Birch	310	186	104	78	Mackinac: Gould City	7.1 mi S on Gould City Rd, 0.5 mile E on 2 track	2001
Betula nigra River Birch	191	115	58	70	Washtenaw: Ann Arbor	1515 Granger	1995
Betula papyrifera var. *cordifolia* Mountain Paper Birch ***NCh***	220	108	90	88	Leelanau: W of Glen Lake	Near Sleeping Bear Dunes	1993
Betula papyrifera Paper Birch ***NCh***	346	220	107	76	Cheboygan	Nr Black Lake	
Betula papyrifera Paper Birch ***NCh***	348	222	107	76	Huron: Grindstone City	3379 Pt Aux Bargeus	1962
Betula pendula European White Birch	254	158	78	71	Leelanau: NW of Traverse City	9510 Cherry Bend Rd	1995
Betula populifolia Gray Birch	155	72	69	54	Kalamazoo: Gull Lake	On grounds, Kellogg Biological Station	1989
Betula ×*purpusii* Hybrid Birch	53	18	31	14	Jackson: N side of Brill Lake	0.22 mi W of Lutz Road	1975
Carpinus caroliniana American Hornbeam	118	69	41	33	Oakland: Bloomfield Hills, Gilbert Lk	4511 Lane Lk Rd (Alexander-owner)	1996
Carya cordiformis Bitternut Hickory	291	170	101	79	Shiawassee: Owasso Ctry Club	4 mi N of Owasso	1984

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Carya glabra Pignut Hickory	241	144	84	53	Jackson: Sheron Valley Road	¼ mi E of Sweeezy Lk Rd	
Carya glabra Pignut Hickory		180			Livingston: Gregory		2002
Carya illinoinensis Pecan	261	174	70	68	Kalamazoo: Gull Lake	Kellogg Biological Station	1989
Carya laciniosa Shellbark Hickory	229	108	96	100	Washtenaw: S of Saline, N of Tecumseh	Arkona & Macon Rds	1963
Carya ovata Shagbark Hickory	222	136	76	38	Calhoun: W of Marshall	Baker Sanitarium	1966
Castanea dentata American Chestnut	292	208	64	80	Grand Traverse	18367 Old Mission Rd	1995
Catalpa bignonioides Southern Catalpa	293	202	74	67	Kent: Sparta	101 W Division St	
Catalpa speciosa Northern Catalpa	276	197	63	62	Ionia: Portland	521 Looking Glass Rd	1996
Catalpa speciosa Northern Catalpa ***NCh***	370	242	107	85	Ingham: Lansing	State Capitol Grounds	1970

Cedrus lebani Cedar of Lebanon		59			Washtenaw: Ann Arbor		2002
Celtis occidentalis Common Hackberry	402	248	126	112	Allegan: 1 mi S of Wayland	10th St & 132nd Ave	1989
Cephalanthus occidentalis Buttonbush	76	35	35	25	Oakland: Bloomfield Hills	Ward Preserve	1973
Cercidiphyllum japonicum Katsura Tree	93	42	43	32	Washtenaw: Ann Arbor	#1 Regent Place	1995
Cercis canadensis Eastern Redbud	125	87	29	36	Washtenaw: Ann Arbor	1605 Morton	1995
Chionanthus virginicus Fringe Tree	48	24	18	25	Grand Traverse: Traverse City	State Hospital grounds	1973
Chionanthus virginicus Fringe Tree		55			Washtenaw: Ann Arbor		2002
Cladrastis lutea Yellow-wood	281	177	80	96	Washtenaw: Ann Arbor	227 Barton Shores Drive	1980
Cornus alternifolia Alternate Leaf Dogwood	58	28	25	20	Oakland: Beverly Hills	17500 Kirkshire Rd	
Cornus florida Flowering Dogwood	124	55	55	56	St. Joseph: 4½ mi W of Burr Oak	N of rd, W end of small valley	1968
Cornus purpusii Silky Dogwood	19	6	11	9	Oakland: Beverly Hills	17503 Kirkshire Rd	1964

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Cornus racemosa Gray Dogwood ***NCh***	62	18	38	24	Oakland: Birmingham	231 Larchlea Rd, W side of Presbyterian Church	1961
Cornus rugosa Roundleaf Dogwood ***NCh***	55	11	40	16	Leelanau: Good Harbor Bay	S of Zeeland; near M-22, S of Duck Lane	1965
Cornus stolonifera Red Osier Dogwood	32	10	17	20	Benzie: Frankfort	M-22 and Anderson Rd	
Corylus americana Hazelnut	55	16	31	33	Oakland: Bloomfield Hills	Lone Pine & 491 Martell Rd	1989
Cotinus coggygria Smoketree	49	26	17	23	Oakland: Ferndale	1728 Pinecrest Rd at 9 Mile Rd	1976
Crataegus crus-galli Cockspur Hawthorn	73	38	29	23	Wayne: Livonia	Rear of 34001 Ann Arbor Tr	1959
Crataegus douglasii Douglas Hawthorn	67	40	25	8	Chippewa: Sugar Island		1964
Crataegus mollis Downy Hawthorn ***NCh***	173	105	52	62	Wayne: Grosse Île	8120 Macomb	1963
Crataegus monogyra Oneseed Hawthorn	103	43	52	30	Wayne: Trenton	Eliz Pk (N)	1975

Crataegus phaenopyrum Washington Hawthorn	57	16	36	19	Oakland: Beverly Hills	17503 Kirkshire	1982
Crataegus punctata Dotted Hawthorn	102	50	39	52	Oakland: Bloomfield Hills	S end of Guilford Rd	1959
Crataegus sp. Hawthorn	120	73	36	45	Wayne: Grosse Île	19903 Park Ln	1964
Crataegus succulenta Fleshy Hawthorn	79	26	42	42	Keweenaw: Delaware	Montreal River	
Diospyros virginiana Persimmon	151	70	69	47	Kent: Grand Rapids	1715 N Center	2001
Dirca palustris Leatherwood	26	13	11	8	Leelanau: S of Empire	High Dunes (S)	1957
Elaeagnus angustifolia Russian Olive	188	115	58	59	Oakland: Bloomfield Hills	459 Martell Dr	1982
Euonymus alata Winged Euonymus	34	10	16	32	Lenawee: Adrian (?)	Oakwood Cemetery	
Euonymus atropurpurea Burning Bush ***NCh***	113	60	45	33	Wayne: Elizabeth Park		
Euonymus europaeus Spindle Tree	118	65	45	33	Wayne: Trenton	Elizabeth Pk	
Fagus grandifolia var. *pendula* American Weeping Beech	120	42	66	48	Kalamazoo: 3.2 mi NE of Richland	10788 W Gull Rd (M-43)	2001

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Fagus grandifolia American Beech	318	193	98	106	Manistee: Onekema	9017 Clark Rd	1995
Fagus sylvatica var. *atropunicea* Copper Beech	292	188	86	72	Jackson: Jackson	N Blackstone & VanBuren Sts	1997
Fagus sylvatica var. *heterophylla* Fern-leaved Beech	217	125	78	55	Manistee: Manistee	429 2nd St	1997
Fagus sylvatica var. *pendula* European Weeping Beech	220	111	86	90	Oakland: Pontiac	Franklin & W Huron	1991
Fraxinus americana White Ash	358	243	100	61	Antrim: S of Elk Rapids	11347 Hanel Rd	1995
Fraxinus nigra Black Ash ***NCh***	281	99	155	108	Lenawee: Adrian	N of Island Pk section 23	1983
Fraxinus pennsylvanica Green Ash ***NCh***	378	259	95	95	Cass: N of Dowagiac	Topash & Townline Rd	1992
Fraxinus quadrangulata Blue Ash	204	105	90	35	Cass: NE of Cassopolis	58652 Decatur Rd, west side	1997
Fraxinus profunda Pumpkin Ash	233	85	135	50	Wayne: Belle Isle	In woods off Central Ave	2001

Ginkgo biloba Ginkgo	242	147	80	60	Hillsdale: Hillsdale	Public library	1993
Gleditsia triacanthos var. *inermis* Thornless Locust ***NCh***	340	198	116	104	Lenawee: W of Adrian	S edge of M-34	1985
Gleditsia triacanthos Honey Locust	320	223	78	74	Wayne: Grosse Île	24532 E River Road	1992
Gymnocladus dioicus Kentucky Coffeetree	308	169	112	109	Van Buren: Hartford	409 Haver	?
Halesia carolina Carolina Silverbell	57	18	29	40	Genesee: SW of Flint	3270 Hill Rd	1976
Hamamelis virginiana Witch-hazel	70	17	43	41	Muskegon: Muskegon State Park	Deep Valley (E trail)	1974
Ilex opaca American Holly	57	27	25	20	Macomb: Mt Clemens	114 N North Ave	1989
Ilex verticillata Michigan Holly	32	10	18	14	Washtenaw: Long Lake	Waterloo Recr Area	1965
Juglans cinerea Butternut	314	189	103	86	Hillsdale: NW of Hudson	1389 Culbert Rd	1989
Juglans nigra Black Walnut	417	266	121	119	Kalamazoo: Kalamazoo	6565 W H Ave	1997
Juglans regia English Walnut	213	144	50	74	Mason: Ludington	4330 S Morton Rd	1997

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Juniperus communis var. *depressa* Ground Juniper	37	17	18	8	Leelanau: Glen Haven	Near Sleeping Bear Dunes	1965
Juniperus communis Common Juniper ***NCh***	90	37	46	28	Washtenaw: Chelsea	5 mi N of Chelsea	
Juniperus virginiana Eastern Red-Cedar	184	111	66	28	Ionia: Portland St Game Area	Along river bank	1991
Koelreuteria paniculata Golden Rain Tree	104	58	38	33	Genesee: Flint	3270 W Hill Rd, Genesee Nursery	1975
Larix decidua European Larch	231	124	84	90	Lenawee: 0.3 mi NE of Macon	Macon Rd	
Larix laricina Eastern Tamarack	214	109	89	64	Lake: Luther	Pond 1 m E, end of road	
Lindera benzoin Spicebush	38	10	23	18	Wayne: Detroit	Belle Isle Nature Center—Vista Ave	1965
Liquidambar styraciflua Sweetgum	169	68	83	70	Grand Traverse: Traverse City	State Hospital	
Liriodendron tulipifera Tulip-tree; Yellow Poplar	367	239	105	90	Wayne: Hower Huron Metro Pk	Tuliptree Tr	1989

Liriodendron tulipifera Tuliptree; Yellow Poplar	403	178	192	133	Branch: 2 mi N of Quincy	Elmer Dodson farm	1979
Maclura pomifera Osage-Orange	229	168	50	45	Berrien: Coloma	Edge of town	1973
Maclura pomifera Osage-Orange		173			Ionia: Lake Odessa		2002
Magnolia acuminata Cucumber Magnolia	257	138	99	81	Lenawee: Adrian	225 N Toledo St (90 yrs old)	
Magnolia acuminata Cucumber Magnolia	252	164	70	75	Berrien: Bertrand Township	3110 Spirea Rd	1993
Magnolia tripetala Umbrella Magnolia		37			Jackson	Van Buren & Blackstone	1997
Magnolia ×soulangeana Saucer Magnolia	75	41	26	32	Washtenaw: Ann Arbor	312 S Division	1995
Magnolia ×soulangeana Saucer Magnolia	106	51	38	66	Berrien: Berrien Springs	D Woodland	2002
Malus angustifolia Southern Crab Apple	46	20	18	33	Wayne: Cass Benton Park	1 mi S of 7 Mile Rd	1966
Malus coronaria Crab Apple	62	26	28	33	Wayne: Plymouth	Middle Rouge Pkwy	1966
Malus ioensis Prairie Crab	101	88	46	68	Oakland: Beverly Hills	17503 Kirkshire	1971
Malus pumila Common Apple	178	138	31	34	Oakland: Bloomfield Hills	Telegraph and W Quarton Rds	1980

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Metasequoia glyptostroboides Dawn Redwood	200	104	86	38	Ingham: East Lansing	MSU-Beal Gardens	1996
Metasequoia glyptostroboides Dawn Redwood		118			Oakland: Bloomfield Hills		2002
Morus alba White Mulberry	348	252	76	79	Lenawee: E of Morenci	5600 E Mulberry; 0.5 mi E of Pense	1981
Morus rubra Red Mulberry	331	231	74	103	Berrien: E of Bridgman	Jericho & Shawnee Rds	1994
Nemopanthus mucronatus Mountain Holly ***NCh***	36	13	20	10	Oakland: Highland	Fish Lake bog	1960
Nyssa sylvatica Tupelo	237	140	77	80	Cass: Marcellus	Near Wright & Burlington Rds	1964
Ostrya virginiana Ironwood; Eastern Hop-hornbeam ***NCh***	217	115	74	111	Grand Traverse: S of Monroe Center	½ mile W of 633 on N side of Miller Road	1995
Phellodendron amurense Amur Cork Tree	77	22	50	18	Cass: NE of Cassopolis	Ed Lowe FDN	2002

Picea abies Norway Spruce	281	170	93	71	Ottawa: Spring Lake	18201 Fruitport Rd.	2002
Picea abies Norway Spruce	267	175	75	67	Jackson: Parma	9498 County Farm Rd.	2002
Picea glauca White Spruce	214	104	102	32	Marquette: Huron Mt Club	Rush Lake	
Picea glauca White Spruce		132			Cheboygan: Cheboygan		2002
Picea mariana Black Spruce	130	57	63	39	Isabella: S of Farwell	0.4 mi S of Heritage Rd, sect 10, Bilmore Twp	1964
Picea pungens Colorado Blue Spruce		96			Oakland: Rochester Hills		2002
Pinus banksiana Jack Pine	169	93	68	30	Marquette: 16 mi S of Marquette	W Branch of Escanaba River	1993
Pinus banksiana Jack Pine	179	97	70	48	Iron: Iron River	SW ¼ SE ¼ sect 28, T42N, R32W	1980
Pinus nigra Austrian Pine	213	138	65	40	Ingham: East Lansing	MSU-across from the Student Union	1996
Pinus nigra Austrian Pine		168			Lenawee: Tecumseh		2002
Pinus ponderosa Ponderosa Pine		57			Saginaw: Burt		2002
Pinus resinosa Red Pine ***NCh***	263	124	124	60	Gogebic: Watersmeet	Sylvania tract, NE of Loon Lake	1993

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Pinus strobus Eastern White Pine ***NCh***	363	200	150	53	Ontonagon: Porc Mt St Pk	Little Carp River Tr	1998
Pinus sylvestris Scotch Pine ***NCh***	269	186	64	76	Lenawee: Sand Creek	5384 Sand Creek Rd (Clare Klink res)	1972
Platanus occidentalis Sycamore	400	256	120	96	Berrien: Berrien Twp	Lake Chapin Rd	1998
Populus alba White Poplar	357	239	86	126	Charlevoix: S of Charlevoix	Barnard Rd; 2 mi S of U.S. 31	
Populus balsamifera Balsam Poplar ***NCh***	307	165	128	57	Marquette: Champion	U.S. 41	1991
Populus deltoides Eastern Cottonwood	473	343	107	92	Wayne: Wayne	Near Michigan and Josephine	1992
Populus grandidentata Bigtooth Aspen ***NCh***	254	105	132	67	Marquette: Huron Mt Club	Fisher Creek Trail	1984
Populus nigra var. *italica* Lombardy Poplar	282	196	81	20	Schoolcraft	2 mi S of Fayette St Pk entrance	1989
Populus tremuloides Quaking Aspen	242	158	72	48	Dickinson: Sturgeon Rn St Forest	12 mi E of Sagola	1966

Populus tremuloides Quaking Aspen ***NCh***	246	122	109	59	Ontanagon: Porc Mt St Pk	S Boundary Road	1991
Prunus americana American Plum	80	36	35	35	Oakland: S of Lakeville		
Prunus armeniaca Apricot	193	123	54	63	Leelanau: Sutton's Bay	Solem Rd just E of Stave Rd	1969
Prunus avium Sweet Cherry	156	104	38	56	Oakland: Rochester	291 Elmhill	1972
Prunus cerasus Common Sour Cherry ***NCh***	206	119	68	75	Calhoun: 3 mi N of Homer	7821 22-Mile Rd	1963
Prunus nigra Canada Plum ***NCh***	113	50	51	48	Macomb: S of Utica	Sterling Hts Pk	1959
Prunus pensylvanica Pin Cherry	148	47	95	22	Kalamazoo: Kalamazoo	Fischer Woods, Douglas Rd	1996
Prunus serotina Wild Black Cherry	422	285	114	93	Van Buren: ½ mi W of Lawrence	S Kane Rd	1959
Prunus serotina Wild Black Cherry	292	195	74	90	Cass: N of Dowagiac	54622 Ruby St	1995
Prunus virginiana Choke Cherry	176	86	73	67	Wayne: Detroit	NE corner of Curtis & McIntire	1966
Pseudotsuga menziesii var. *menziesii* Douglas Fir	143	62	72	36	Washtenaw: Ann Arbor	1155 Arlington	1995

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Pseudotsuga menziesii var. *menziesii* Douglas Fir		88			Washtenaw: Ann Arbor		2002
Ptelea trifoliata Common Hoptree ***NCh***	78	33	35	40	Kent: Ada	Thornapple Community Pk	1989
Pyrus communis Common Pear	200	136	51	50	Oakland: Clawson	1034 Cooks Rd	1966
Quercus alba White Oak	375	260	84	125	Allegan: Allegan	1308 Ely St	1993
Quercus alba White Oak		265			Ionia: Lowell		2002
Quercus alba × *macrocarpa* (= *Q.* ×*bebbiana*) Bebbs Oak	325	200	100	100	Eaton: Charlotte	along I-69; take Charlotte exit 60 going east	1996
Quercus alba × *macrocarpa* ×= *Q.* ×*bebbiana* Bebbs Oak	319	220	73	105	Oakland: Rochester Hills	Livernois & Auburn Roads	1997

Quercus alba × *bicolor* (=*Q.* ×*jackiana*) Jack Oak	317	165	188	137	Livingston: Howell	Grand Riv (503)	1975
Quercus bicolor Swamp White Oak	397	246	119	127	Wayne: Canton Twp	Rouge Br (Sw of Palsar & Sheldon)	1988
Quercus bicolor × *macrocarpa* (= *Q.* ×*schuettii*) Schuette Oak	363	242	97	98	Oakland: N Rochester	Letts & Rush	1998
Quercus coccinea Scarlet Oak	392	243	117	126	Hillsdale: E of Jonesville	N Adams Rd	
Quercus ellipsoidalis Northern Pin Oak	271	139	103	115	Oakland: S of Lake Orion	Bald Mt Rd S of Greenleaf	
Quercus imbricaria Shingle Oak	285	140	116	117	Calhoun: SW of Albion	22-Mile Rd & D Dr S	
Quercus macrocarpa Bur Oak	407	288	92	106	Berrien: Niles	702 Chippewa Trail	1994
Quercus muehlenbergii Chinkapin Oak	368	215	120	132	Washtenaw: Ann Arbor	Wurster Park	
Quercus palustris Pin Oak	290	159	106	101	Wayne: Dearborn	24824 Fairmont	1970
Quercus palustris Pin Oak		213			St. Clair: Port Huron		2002

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Quercus prinoides Dwarf Chestnut Oak	75	23	46	23	Berrien: Warren Dunes St Pk	W @ Lake Price & stream	1960
Quercus prinus Chestnut Oak		97			Jackson	Springbrook Rd S of Mud Lake nr Bader Rd	1991
Quercus robur English Oak	255	155	81	76	Benzie: Benzonia	Case near Homestead	1975
Quercus rubra Red/Northern Oak	398	276	100	87	Allegan: Saugatuck	329 St. Joseph	1993
Quercus rubra × *imbricaria* (= *Q.* ×*runcinata*) Bottom Oak	275	152	96	106	Branch: Coldwater	338 E Chicago	1975
Quercus rubra × *velutina* (= *Q.* ×*hawkinsiae*) Hawkins Oak		46			Jackson: Waterloo Recr Area	Nature trail at headquarters	1966
Quercus shumardii Shumard Oak	304	158	128	70	Wayne: Belle Isle	In woods off Central Ave	2001
Quercus velutina Black Oak	412	247	131	137	St. Clair: Algonac	Washington & Clay (school)	1964
Rhamnus cathartica European Buckthorn	109	68	34	26	Kalamazoo: Kalamazoo	Kalamazoo Nat Ctr, along River Trail	1988

Rhamnus cathartica European Buckthorn ***NCh***	122	45	61	65	Washtenaw: Ann Arbor	N of Huron R opposite Nichol Arb	1972
Rhamnus frangula Glossy Buckthorn	65	23	35	22	Oakland: Pleasant Ridge	20 Kemberton	1967
Rhamnus frangula Glossy Buckthorn ***NCh***	66	20	40	25	Oakland: Bloomfield Hills	Cranbrook Inst of Science	1975
Rhus copallina Shining Sumac ***NCh***	58	20	33	20	Kalamazoo: Vicksburg	Prudential Nursery	1975
Rhus glabra Smooth Sumac	37	13	18	23	Hillsdale: 1 mi S of Somerset ctr	Waldrin Rd, edge of fen	1986
Rhus typhina Staghorn Sumac	72	41	25	25	Cass: Cassopolis	405 Smith St	
Robinia pseudoacacia Black Locust	351	234	96	85	Hillsdale: 7 mi NE Pittsford	1334 Stewart	1972
Salix alba White willow ***NCh***	470	301	133	142	Oakland: 2 mi N of New Hudson	Maple Rd, 200 ft E of Milford Rd	1990
Salix alba var *tristis* Golden Willow	426	343	70	51	Oakland: Lyon Twp; W of New Hudson	60690 Pontiac Tr	1962
Salix amygdaloides Peachleaf Willow	281	134	111	143	St. Clair: Algonac	State Park	1989
Salix babylonica Weeping Willow ***NCh***	453	344	86	93	Livingston: Hartland	4450 Bullard Rd	
Salix babylonica Weeping Willow ***NCh***	455	309	117	116	Wayne: Detroit	886 Ashland (S of Jefferson)	1964

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Salix bebbiana Bebbs Willow	72	36	31	18	Leelanau: N of Maple City	S Lime Lake Rd	1960
Salix discolor Pussy Willow ***NCh***	109	54	47	33	Clinton: St. Johns	718 S Lansing	1980
Salix exigua Sandbar Willow	76	28	42	23	Macomb	Footbridge, Utica Recr Area	1967
Salix fragilis Crack Willow	444	338	82	94	Oakland: Beverly Hills	Douglas, 31805 Evergreen Rd	1985
Salix fragilis Crack Willow ***NCh***	458	305	122	124	Macomb: NW of Utica, Utica Recr Area	S side of bridge, E side of river	1964
Salix fragilis Crack Willow ***NCh***	459	310	116	131	Oakland: Beverly Hills		
Salix matsudana f. *tortuosa* Corkscrew Willow	150	66	73	44	Leelanau: Northport	202 Waukazoo St	1995
Salix lucida Shining Willow ***NCh***	224	130	74	81	Grand Traverse: Traverse City	State Hospital	1960
Salix nigra Black Willow ***NCh***	499	400	76	92	Grand Traverse: Traverse City	State Hospital (W side)	1995
Salix petiolaris Meadow Willow ***NCh***	52	13	34	18	Leelanau	Traverse Lake (E shore)	1975

Salix purpurea Purple-Osier Willow ***NCh***	64	15	37	49	Leelanau: W of Omena	NW corner of Putnam & Coiltery (#629)	1971
Salix pyrifolia Balsam Willow	28	11	15	8	Chippewa: Sugar Island		
Salix serissima Autumn Willow ***NCh***	94	35	48	44	Oakland: Birmingham	Northlawn & Cranbrook Rds	
Sambucus canadensis Common Elderberry	45	14	26	18	Leelanau: Cedar City	swamp along RR	1976
Sambucus pubens Red Elderberry	51	20	27	15	Keweenaw: Lac La Belle	2 mi NE	1972
Sassafras albidum Sassafras	276	182	78	64	Jackson: Jackson	1318 Coddington Ln	1984
Sassafras albidum Sassafras	250	175	60	58	Cass: Dowagiac	Indian Lake	2002
Sequoiadendron giganteum Giant Sequoia	248	151	89	30	Manistee	Lake Bluff Audubon, 2890 Lakeshore Dr	1995
Sophora japonica Japanese Pagoda	266	136	102	110	Monroe: Monroe	Elm St & U.S. 25; St. Mary's	1970
Sorbus americana American Mountain Ash	128	62	57	35	Houghton: Lorus Pt	Little Traverse Bay on Keweenaw Bay	1984
Sorbus aucuparia European Mountain Ash	94	56	32	25	Grand Traverse	8641 U.S. 31 North (Fran Zanes – owner)	1996
Sorbus decora Showy Mountain Ash	108	63	37	35	Houghton: N of Acme	Calvert St S of 3rd St	1966

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Sorbus decora Showy Mountain Ash ***NCh***	123	57	58	32	Mackinac	7 mi S Gould C; section 33, SW¼ NE¼	1972
Sorbus sp. Oakleaf Mountain Ash		88			Mason: Scottville	on E side of Kinter Rd, near Wilson Rd	
Staphylea trifoliata American Bladdernut		53			Wayne: Northville		2002
Staphylea trifoliata American Bladdernut ***NCh***	64	19	36	37	Macomb: NW of Utica	Utica Recr Area, S end	1965
Syringa vulgaris Lilac	102	65	30	29	Mackinac: St. Ignace	332 Pt La Garbe Rd	1998
Taxodium distichum var. *distichum* Baldcypress	193	116	68	34	Kalamazoo: Kalamazoo	Kleinstuck Preserve	1996
Thuja occidentalis White Cedar	340	216	113	42	Leelanau: S Manitou Island	Valley of Giants	
Tilia americana Basswood	349	275	57	68	Ingham: SE of Dansville	S side of M-36	1993
Toxicodendron vernix Poison Sumac	54	15	31	30	Oakland: Lakeville Swamp	SE of Lakeville	1964
Tsuga canadensis Eastern Hemlock	301	164	121	62	Emmet: S of Cross Village	316 Petosky St	1981

Tsuga caroliniana Carolina Hemlock	192	95	81	62	Oakland: Bloomfield Hills		
Ulmus americana American Elm	383	237	119	108	Wayne: Grosse Pt Farms	372 Provencal	2001
Ulmus glabra Wych Elm	274	158	97	77	Wayne: Grosse Pt Blvd	At Dyer in a lane	1965
Ulmus parvifolia Chinese Lacebark Elm	149	76	56	68	Washtenaw: Ann Arbor	1605 E Stadium	1995
Ulmus procera English Elm	198	179	76	48	Washtenaw: Ann Arbor	2100 Devonshire	1995
Ulmus pumila Siberian Elm	351	234	94	92	Ottawa: Zeeland	370 E Rich Road on the N side of Bus I-96	1996
Ulmus pumila Siberian Elm		255			Livingston: Gregory		2002
Ulmus rubra Slippery Elm	324	160	140	97	Oakland: Havenhill	Swamp, NE end	1958
Ulmus serotina September Elm	193	102	74	68	Wayne: Trenton	Eliz Pk	1965
Ulmus thomasii Rock Elm ***NCh***	350	202	117	122	Cass: Cassopolis, 3 mi SE	Brownville & Crooked Cr	?
Ulmus ×vegeta Camperdown Elm		67			Jackson	1st St between Mich & Wildwood	1998
Viburnum alnifolium Hobble-bush	32	10	18	15	Wayne: Trenton	Elizabeth Pk, E of lagoon	1975

(Continued)

TABLE 2: Continued

Measurements of girth are in inches 4½ feet above ground; measurements of height and average crown spread are in feet. Points = Girth + Height + ¼ of the Crown Spread. NCh denotes a current or former National Champion.

Latin name common name	Points	Girth	Height	Crown spread	County: Town	Location	Year
Viburnum lentago Nannyberry ***NCh***	94	34	50	40	Oakland: Bloomfield Hills	N of Cranbrook Inst Sci	
Viburnum prunifolium Black Haw	48	17	24	27	Oakland: SW of Lakeville	cedar swamp	1962
Viburnum trilobum Highbush-Cranberry ***NCh***	49	18	25	25	Wayne: Trenton	Elizabeth Pk W of lagoon	1975
Viburnum trilobum Highbush-Cranberry ***NCh***	50	10	32	31	Wayne: Grosse Isle	Westcroft Gardens Lane	1985
Viburnum trilobum Highbush-Cranberry ***NCh***	50	10	32	31	Oakland: Bloomfield Hills	Cranbrook Inst Sci	
Zanthoxylum americanum Prickly-Ash ***NCh***	53	15	28	38	Oakland: Beverly Hills	Rouge Park, W of Evergreen	1978

TABLE 3. Alphabetical list of abbreviations used in Table 2 of the Champion Trees and Shrubs of Michigan

@	at
Arb	Arboretum
Ave	Avenue
Blvd	Boulevard
Br	Branch
Bus	Business
Cranbrook Inst. Sci.	Cranbrook Institute of Science
Ck	Creek
Co	County
Crk	Creek
Ctr	Center
Ctry	Country
E	East
Dr	Drive
Eliz Park	Elizabeth Park
Entr	Entrance
Ft	Feet
Ft	Fort
Gov't	Government
H	Height in feet
Hdqs	Headquarters
HS	High School
Hts	heights
Huron Mt Club	Huron Mountain Club
Hwy	Highway
Inst	Institute
Is	Island
Kellogg Bio. Station	Kellogg Biological Station
Lk	Lake
Ln	Lane
M	Michigan State Road
Mi	Mile
Mich	Michigan
MSU	Michigan State University
Mt	Mount
Mt	Mountain
N	North
Nat	Nature
Nat'l	National
NCh	Current or former National Champion
NE	Northeast
Nr	Near
NW	Northwest
Pk	Park
Pkwy	Parkway
Porc Mt St Pk	Porcupine Mountain State Park
Pres	Preserve
Pt	Point
Pte	Pointe
Pts	Points
R	River
R	Range

(Continued)

TABLE 3. Continued

Rd	Road
Rds	Roads
Recr	Recreation
Res	Residence
Riv	River
Rn	Run
Rt	Route
Rte	Route
RR	Railroad
S	South
Sci	Science
SE	Southeast
Sec	Section
Sect.	Section
St.	Saint
St	State
St	Street
Sts	Streets
St Pk	State Park
T	Township
Tr	Trail
Twp	Township
US	US Highway
Utica Recr Area	Utica Recreation Area
W	West
×	hybrid
Yrs	Years

The location column provides the best information available in the state's big tree records. In many cases it is both exact and accurate, e.g. a street address or intersection. In other cases, the information is more vague, e.g., near Sleeping Bear Dunes.

IMPROVING THE LISTS

The three best ways in which the current lists can be improved lie in: 1.) determining if a listed tree or shrub still exists, 2.) obtaining exact and accurate information on the location of each tree or shrub listed and 3.) obtaining up-to-date measurements. It is hoped that users of the list will continue to supply such information to the State's Big Tree Coordinator and that each succeeding version of these lists will be better than the last.

TABLE 4. Common Names of Michigan's Champion Trees and Shrubs

Common Name	Species
Alder, Black	Alnus glutinosa
Alder, Speckled	Alnus rugosa
Apple, Common	Malus pumila
Apple, Crab	Malus coronaria
Apple, Southern Crab	Malus angustifolia
Apricot	Prunus armeniaca
Ash, Black	Fraxinus nigra
Ash, Blue	Fraxinus quadrangulata
Ash, Green	Fraxinus pennsylvanica
Ash, Pumpkin	Fraxinus profunda
Ash, Red	Fraxinus pennsylvanica
Ash, White	Fraxinus americana
Aspen, Bigtooth	Populus grandidentata
Aspen, Quaking	Populus tremuloides
Baldcypress	Taxodium distichum
Basswood	Tilia americana
Beech, American	Fagus grandifolia
Beech, American Weeping	Fagus grandifolia var. pendula
Beech, Copper	Fagus sylvatica var. atropunicea
Beech, European Weeping	Fagus sylvatica var. pendula
Beech, Fern-Leaved	Fagus sylvatica var. heterophylla
Birch, European White	Betula pendula
Birch, Gray	Betula populifolia
Birch, Hybrid	Betula ×purpusii
Birch, Mt. Paper	Betula papyrifera var. cordifolia
Birch, Paper	Betula papyrifera
Birch, River	Betula nigra
Birch, Yellow	Betula alleghaniensis
Black Haw	Viburnum prunifolium
Bladdernut, American	Staphylea trifoliata
Bluebeech	Carpinus caroliniana
Box-elder	Acer negundo
Buckeye, Ohio	Aesculus glabra
Buckeye, Red	Aesculus pavia
Buckeye, Yellow	Aesculus octandra
Buckthorn, European	Rhamnus cathartica
Buckthorn, Glossy	Rhamnus frangula
Burning-bush	Euonymus atropurpurpea
Butternut	Juglans cinerea
Buttonbush	Cephalanthus occidentalis
Catalpa, Northern	Catalpa speciosa
Catalpa, Southern	Catalpa bignoniodes
Cedar of Lebanon	Cedrus lebani
Cedar, White	Thuja occidentalis
Cherry, Choke	Prunus virginiana
Cherry, Common Sour	Prunus cerasus
Cherry, Pin	Prunus pensylvanica
Cherry, Sweet	Prunus avium
Cherry, Wild Black	Prunus serotina
Chestnut, American	Castanea dentata
Chokeberry	Aronia melanocarpa
Cockspur thorn	Crataegus crus-galli
Coffee-tree, Kentucky	Gymnocladus dioicus

(Continued)

TABLE 4. Continued

Common Name	Species
Cork Tree, Amur	Phellodendron amurense
Cottonwood, Eastern	Populus deltoides
Crab, Prairie	Malus ioënsis
Cucumber-tree	Magnolia acuminata
Cypress, Bald	Taxodium distichum
Devil's Walking Stick	Aralia spinosa
Dogwood, Alternate Leaved	Cornus alternifolia
Dogwood, Flowering	Cornus florida
Dogwood, Gray	Cornus foemina var. racemosa
Dogwood, Red-oiser	Cornus stolonifera
Dogwood, Roundleaf	Cornus rugosa
Dogwood, Silky	Cornus purpusii
Douglas-Fir	Pseudotsuga menziesii
Elderberry, Common	Sambucus canadensis
Elderberry, Red	Sambucus pubens
Elm, American	Ulmus americana
Elm, Camperdown	Ulmus ×vegeta
Elm, Chinese Lacebark	Ulmus parvifolia
Elm, English	Ulmus procera
Elm, Rock	Ulmus thomasii
Elm, September	Ulmus serotina
Elm, Siberian	Ulmus pumila
Elm, Slippery	Ulmus rubra
Elm, Wych	Ulmus glabra
Euonymus, Winged	Euonymus alata
Fir, Balsam	Abies balsamea
Fir, Douglas	Pseudotsuga menziesii
Fir, Fraser	Abies fraseri
Fir, Nordmann	Abies nordmanniana
Fir, White	Abies concolor
Fringe Tree	Chionanthus virginicus
Ginkgo	Ginkgo biloba
Golden-rain Tree	Koelreuteria paniculata
Hackberry, Common	Celtis occidentalis
Hawthorn	Crataegus sp.
Hawthorn, Black	Crataegus douglasii
Hawthorn, Cockspur	Crataegus crus-galli
Hawthorn, Dotted	Crataegus punctata
Hawthorn, Douglas	Crataegus douglasii
Hawthorn, Downy	Crataegus mollis
Hawthorn, English	Crataegus monogyra
Hawthorn, Fleshy	Crataegus succulenta
Hawthorn, Oneseed	Crataegus monogyra
Hawthorn, Washington	Cragaegus phaenopyrum
Hazelnut, American	Corylus americana
Hemlock, Carolina	Tsuga caroliniana
Hemlock, Eastern	Tsuga canadensis
Hickory, Bitternut	Carya cordiformis
Hickory, Pignut	Carya glabra
Hickory, Shagbark	Carya ovata
Hickory, Shellbark	Carya laciniosa
Highbush-Cranberry	Viburnum opulus var. americanum
Hobble-bush	Viburnum alnifolium

(Continued)

TABLE 4. Continued

Common Name	Species
Holly, American	Ilex opaca
Holly, Michigan	Ilex verticillata
Holly, Mountain	Nemopanthus mucronatus
Honey-Locust	Gleditsia triacanthos
Hop-hornbeam, Eastern	Ostrya virginiana
Hop-tree	Ptelea trifoliata
Hornbeam, American	Carpinus caroliniana
Horse-Chestnut	Aesculus hippocastanum
Ironwood	Ostrya virginiana
Juniper, Common	Juniperus communis
Juniper, Ground	Juniperus communis var. depressa
Katsura Tree	Cercidiphyllum japonicum
Larch, European	Larix decidua
Leatherwood	Dirca palustris
Lilac	Syringa vulgaris
Locust, Black	Robinia pseudoacacia
Locust, Honey	Gleditsia triacanthos
Locust, Thornless	Gleditsia triacanthos var. inermis
Magnolia, Cucumber	Magnolia acuminata
Magnolia, Saucer	Magnolia ×soulangeana
Magnolia, Umbrella	Magnolia tripetala
Maple, Amur	Acer ginnala
Maple, Black	Acer nigrum
Maple, Hedge	Acer campestre
Maple, Mountain	Acer spicatum
Maple, Norway	Acer platanoides
Maple, Paperbark	Acer griseum
Maple, Red	Acer rubrum
Maple, Silver	Acer saccharinum
Maple, Striped	Acer pensylvanicum
Maple, Sugar	Acer saccharum
Maple, Sycamore	Acer pseudoplatanus
Mountain-ash, American	Sorbus americana
Mountain-ash, European	Sorbus aucuparia
Mountain-ash, Oakleaf	Sorbus sp.
Mountain-ash, Showy	Sorbus decora
Mulberry, Red	Morus rubra
Mulberry, White	Morus alba
Nannyberry	Viburnum lentago
Oak, ?	Quercus bicolor × prinus
Oak, Bebb's	Quercus macrocarpa × alba
Oak, Bebb's	Quercus ×bebbiana
Oak, Black	Quercus velutina
Oak, Bottom	Quercus ×runcinata
Oak, Bur	Quercus macrocarpa
Oak, Chestnut	Quercus prinus
Oak, Chinkapin	Quercus muehlenbergii
Oak, Dwarf Chestnut	Quercus prinoides
Oak, English	Quercus robur
Oak, Hawkins	Quercus rubra × velutina
Oak, Jack	Quercus bicolor × alba
Oak, Northern Pin	Quercus ellipsoidalis
Oak, Pin	Quercus palustris

(Continued)

TABLE 4. Continued

Common Name	Species
Oak, Red/Northern	Quercus rubra
Oak, Scarlet	Quercus coccinea
Oak, Schuette	Quercus ×schuettii
Oak, Shingle	Quercus imbricaria
Oak, Shumard	Quercus shumardii
Oak, Swamp White	Quercus bicolor
Oak, White	Quercus alba
Olive, Russian	Elaeagnus angustifolia
Osage-Orange	Maclura pomifera
Pagoda-tree, Japanese	Sophora japonica
Pawpaw	Asimina triloba
Pear, Common	Pyrus communis
Pecan	Carya illinoinensis
Persimmon	Diospyros virginiana
Pine, Austrian	Pinus nigra
Pine, Eastern White	Pinus strobus
Pine, Jack	Pinus banksiana
Pine, Ponderosa	Pinus ponderosa
Pine, Red	Pinus resinosa
Pine, Scotch	Pinus sylvestris
Plum, American	Prunus americana
Plum, Canada	Prunus nigra
Poplar, Balsam	Populus balsamifera
Poplar, Lombardy	Populus nigra var. italica
Poplar, White	Populus alba
Prickly-Ash	Zanthoxylum americanum
Red-Cedar, Eastern	Juniperus virginiana
Redbud, Eastern	Cercis canadensis
Redwood, Dawn	Metasequoia glyptostroboides
Russian-Olive	Elaeagnus angustifolia
Sassafras	Sassafras albidum
Sequoia, Giant	Sequoiadendron giganteum
Serviceberry, Downy	Amelanchier arborea
Serviceberry, Roundleaf	Amelanchier sanguinea
Serviceberry, Allegheny	Amelanchier laevis
Silverbell, Carolina	Halesia carolina
Smoketree	Cotinus coggygria
Sour-gum	Nyssa sylvatica
Spicebush	Lindera benzoin
Spindle Tree	Euonymus europaeus
Spruce, Black	Picea mariana
Spruce, Colorado Blue	Picea pungens
Spruce, Norway	Picea abies
Spruce, White	Picea glauca
Sumac, Poison	Toxicodendron vernix
Sumac, Shining	Rhus copallina
Sumac, Smooth	Rhus glabra
Sumac, Staghorn	Rhus typhina
Sweetgum	Liquidambar styraciflua
Sycamore	Platanus occidentalis
Tamarack, Eastern	Larix laricina
Tree-Of-Heaven	Ailanthus altissima

(Continued)

TABLE 4. Continued

Common Name	Species
Tulip-tree	Liriodendron tulipifera
Tupelo	Nyssa sylvatica
Viburnum	Viburnum alnifolium
Walnut, Black	Juglans nigra
Walnut, English	Juglans regia
White-cedar, Northern	Thuja occidentalis
Willow, Autumn	Salix serissima
Willow, Balsam	Salix pyrifolia
Willow, Basket	Salix purpurea
Willow, Bebb's	Salix bebbiana
Willow, Black	Salix nigra
Willow, Corkscrew	Salix matsudana f. tortuosa
Willow, Crack	Salix fragilis
Willow, Golden	Salix alba var. tristis
Willow, Meadow	Salix petiolaris
Willow, Peachleaf	Salix amygdaloides
Willow, Purple-Osier	Salix purpurea
Willow, Pussy	Salix discolor
Willow, Sandbar	Salix exigua
Willow, Shining	Salix lucida
Willow, Weeping	Salix babylonica
Willow, White	Salix alba
Witch-Hazel	Hamamelis virginiana
Yellow Poplar	Liriodendron tulipifera
Yellow-wood	Cladrastis lutea

TABLE 5. County list of Michigan's Champion Trees and Shrubs. * indicates current or former National Champion.

Allegan	
Acer nigrum*	Maple, Black
Celtis occidentalis	Hackberry, Common
Quercus alba	Oak, White
Quercus rubra	Oak, Northern Red
Antrim	
Fraxinus americana	Ash, White
Barry	
Amelanchier arborea	Serviceberry, Downy
Benzie	
Cornus stolonifera	Dogwood, Red Osier
Quercus robur	Oak, English
Berrien	
Maclura pomifera	Osage-Orange
Magnolia acuminata	Cucumber-tree
Magnolia ×soulangeana	Magnolia, Saucer
Morus rubra	Mulberry, Red
Platanus occidentalis	Sycamore
Quercus macrocarpa	Oak, Bur
Quercus prinoides	Oak, Dwarf Chestnut
Branch	
Quercus ×runcinata*	Oak, Bottom
Liriodendron tulipifera	Tuliptree/Poplar, Yellow
Calhoun	
Carya ovata	Hickory, Shagbark
Prunus cerasus*	Cherry, Common Sour
Quercus imbricaria	Oak, Shingle
Cass	
Fraxinus pennsylvanica*	Ash, Red
Fraxinus quadrangulata	Ash, Blue
Nyssa sylvatica	Tupelo
Phellodendron amurense	Amur Cork Tree
Prunus serotina	Cherry, Wild Black
Rhus typhina	Sumac, Staghorn
Ulmus thomasii*	Elm, Rock
Charlevoix	
Populus alba	Poplar, White
Cheboygan	
Betula papyrifera*	Birch, Paper
Picea glauca	Spruce, White
Chippewa	
Crataegus douglasii	Hawthorn, Black
Salix pyrifolia	Willow, Balsam

(Continued)

TABLE 5. Continued

Clinton	
Salix discolor*	Willow, Pussy
Dickinson	
Populus tremuloides	Aspen, Quaking
Eaton	
Quercus macrocarpa × alba	Oak, Bebb's
Emmet	
Tsuga canadensis	Hemlock, Eastern
Genessee	
Halesia carolina	Silverbell, Carolina
Koelreuteria paniculata	Golden-rain Tree
Gogebic	
Pinus resinosa*	Pine, Red
Grand Traverse	
Castanea dentata	Chestnut, American
Chionanthus virginicus	Fringe Tree
Liquidambar styraciflua	Sweet Gum
Ostrya virginiana*	Ironwood, Hop-hornbeam
Salix lucida*	Willow, Shining
Salix nigra*	Willow, Black
Sorbus aucuparia	Mountain-ash, European
Hillsdale	
Ginkgo biloba	Ginkgo
Juglans cinerea	Butternut
Quercus coccinea	Oak, Scarlet
Rhus glabra	Sumac, Smooth
Robinia pseudoacacia	Locust, Black
Houghton	
Acer spicatum*	Maple, Mountain
Sorbus americana	Mountain-ash, American
Sorbus decora	Mountain-ash, Showy
Huron	
Betula papyrifera*	Birch, Paper
Ingham	
Catalpa speciosa*	Catalpa, Northern
Metasequoia glyptostroboides	Redwood, Dawn
Pinus nigra	Pine, Austrian
Tilia americana	Basswood
Ionia	
Abies concolor	Fir, White
Catalpa speciosa	Catalpa, Northern
Juniperus virginiana	Red-Cedar, Eastern
Maclura pomifera	Osage-Orange
Quercus alba	Oak, White

(Continued)

TABLE 5. Continued

Iron	
Pinus banksiana	Pine, Jack
Isabella	
Picea mariana	Spruce, Black
Jackson	
Betula ×purpusii	Birch, Hybrid
Carya glabra	Hickory, Pignut
Fagus sylvatica var. atropunicea	Beech, Copper
Magnolia tripetala	Magnolia, Umbrella
Quercus prinus	Oak, Chestnut
Quercus rubra × velutina	Oak, Hawkins
Sassafras albidum	Sassafras
Ulmus ×vegeta	Elm, Camperdown
Kalamazoo	
Acer campestre	Maple, Hedge
Aesculus octandra	Buckeye, Yellow
Aesculus pavia*	Buckeye, Red
Betula populifolia	Birch, Gray
Carya illinoinensis	Pecan
Fagus grandifolia var. pendula	Beech, American Weeping
Juglans nigra	Walnut, Black
Prunus pensylvanica	Cherry, Pin
Rhamnus carthartica	Buckthorn, European
Rhus copallina*	Sumac, Shining
Taxodium distichum	Cypress, Bald
Kent	
Catalpa bignonioides	Catalpa, Southern
Diospyros virginiana	Persimmon
Ptelea trifoliata*	Hop-tree
Keweenaw	
Amelanchier sanguinea	Serviceberry, Roundleaf
Crataegus succulenta	Hawthorn, Fleshy
Sambucus pubens*	Elderberry, Red
Lake	
Larix laricina	Tamarack
Leelanau	
Acer platanoides	Maple, Norway
Amelanchier laevis	Serviceberry, Smooth
Betula papyrifera var. cordifolia*	Birch, Mt. Paper
Betula pendula	Birch, European White
Cornus rugosa*	Dogwood, Roundleaf
Dirca palustris	Leatherwood
Juniperus communis var. depressa	Juniper, Ground
Prunus armeniaca	Apricot
Salix bebbiana	Willow, Bebb's
Salix matsudana f. tortuosa	Willow, Corkscrew
Salix petiolaris*	Willow, Meadow
Salix purpurea*	Willow, Purple-osier or Basket
Sambucus canadensis	Elderberry, Common
Thuja occidentalis*	White-Cedar, Northern

(Continued)

TABLE 5. Continued

Lenawee	
Aesculus glabra	Buckeye, Ohio
Euonymus alata	Euonymus, Winged
Fraxinus nigra*	Ash, Black
Gleditsia triacanthos var. inermis*	Locust, Thornless
Larix decidua	Larch, European
Magnolia acuminata	Magnolia, Cucumber
Morus alba	Mulberry, White
Pinus nigra	Pine, Austrian
Pinus sylvestris*	Pine, Scotch
Livingston	
Acer negundo	Box-elder
Carya glabra	Hickory, Pignut
Quercus bicolor × alba	Oak, Jack
Salix babylonica*	Willow, Weeping
Ulmus pumila	Elm, Siberian
Luce	
Acer saccharinum	Maple, Silver
Mackinac	
Betula alleghaniensis	Birch, Yellow
Sorbus decora*	Mountain-ash, Showy
Syringa vulgaris	Lilac
Macomb	
Asimina triloba	Pawpaw
Ilex opaca	Holly, American
Prunus nigra*	Plum, Canada
Salix exigua	Willow, Sandbar
Salix fragilis*	Willow, Crack
Staphylea trifoliata*	Bladdernut, American
Manistee	
Acer pseudoplatanus	Maple, Sycamore
Acer saccharum	Maple, Sugar
Fagus grandifolia	Beech, American
Fagus sylvatica var. heterophylla	Beech, Fern-leaved
Sequoiadendron giganteum	Sequoia, Giant
Marquette	
Acer pensylvanicum	Maple, Striped
Picea glauca	Spruce, White
Pinus banksiana	Pine, Jack
Populus balsamifera*	Poplar, Balsam
Populus grandidentata*	Aspen, Bigtooth
Mason	
Juglans regia	Walnut, English
Sorbus sp.	Mountain-ash, Oakleaf
Monroe	
Ailanthus altissima	Tree-of-Heaven
Sophora japonica	Pagoda-tree, Japanese

(Continued)

TABLE 5. Continued

Montcalm	
Acer saccharum	Maple, Sugar
Muskegon	
Hamamelis virginiana	Witch-hazel
Oakland	
Acer saccharinum	Maple, Silver
Aralia spinosa	Devil's Walking Stick
Aronia melanocarpa	Chokeberry
Carpinus caroliniana	Hornbeam, American or Bluebeech
Cephalanthus occidentalis	Buttonbush
Cornus alternifolia	Dogwood, Alternate leaved
Cornus foemina var. racemosa*	Dogwood, Gray
Cornus purpusii	Dogwood, Silky
Corylus americana*	Hazelnut, American
Cotinus coggygria	Smoketree
Crataegus phaenopyrum	Hawthorn, Washington
Crataegus punctata	Hawthorn, Dotted
Elaeagnus angustifolia	Russian-Olive
Fagus sylvatica var. pendula	Beech, European Weeping
Malus ioënsis*	Crab, Prairie
Malus pumila	Apple, Common
Metasequoia glyptostroboides	Redwood, Dawn
Nemonpanthus mucronatus*	Holly, Mountain
Picea pungens	Spruce, Colorado Blue
Prunus americana	Plum, Wild American
Prunus avium	Cherry, Sweet
Pyrus communis	Pear, Common
Quercus ×bebbiana	Oak, Bebb's
Quercus ellipsoidalis	Oak, Northern Pin
Quercus ×schuettii	Oak, Schuette
Rhamnus frangula*	Buckthorn, Glossy
Rhamnus frangula	Buckthorn, Glossy
Salix alba*	Willow, White
Salix alba var. tristis	Willow, Golden
Salix fragilis	Willow, Crack
Salix fragilis*	Willow, Crack
Salix serissima*	Willow, Autumn
Toxicodendron vernix	Sumac, Poison
Tsuga caroliniana	Hemlock, Carolina
Ulmus rubra	Elm, Slippery
Vibrunum lentago*	Nannyberry
Viburnum prunifolium	Black Haw
Viburnum trilobum*	Highbush-Cranberry
Zanthoxylum americanum*	Prickly-Ash
Oceana	
Picea abies	Spruce, Norway
Ontonagon	
Abies balsamea	Fir, Balsam
Pinus strobus*	Pine, Eastern White
Populus tremuloides*	Aspen, Quaking

(Continued)

TABLE 5. Continued

Ottawa	
Ulmus pumila	Elm, Siberian
Saginaw	
Pinus ponderosa	Pine, Ponderosa
Schoolcraft	
Populus nigra var. italica	Poplar, Lombardy
Shiawassee	
Carya cordiformis	Hickory, Bitternut
St. Clair	
Acer rubrum*	Maple, Red
Ailanthus altissima	Tree-of-Heaven
Alnus rugosa*	Alder, Speckled
Quercus palustris	Oak, Pin
Quercus velutina*	Oak, Black
Salix amygdaloides	Willow, Peachleaf
St. Joseph	
Cornus florida	Dogwood, Flowering
Van Buren	
Gymnocladus dioicus	Coffee-tree, Kentucky
Prunus serotina	Cherry, Wild Black
Washtenaw	
Abies nordmanniana	Fir, Nordmann
Acer ginnala	Maple, Amur
Acer griseum	Maple, Paperbark
Acer negundo*	Box-elder
Betula nigra	Birch, River
Carya laciniosa	Hickory, Shellbark
Cedrus lebani	Cedar of Lebanon
Cercidiphyllum japonicum	Katsura Tree
Cercis canadensis	Redbud, Eastern
Chionanthus virginicus	Fringe Tree
Cladrastis lutea	Yellow-wood
Ilex verticillata	Holly, Michigan
Juniperus communis*	Juniper, Common
Magnolia ×soulangeana	Magnolia, Saucer
Pseudotsuga menziesii	Douglas-Fir
Quercus muehlenbergii	Oak, Chinkapin
Rhamnus cathartica*	Buckthorn, European
Ulmus parvifolia	Elm, Chinese Lacebark
Ulmus procera	Elm, English
Wayne	
Abies fraseri	Fraser Fir
Aesculus hippocastanum	Horse-Chestnut
Alnus glutinosa	Alder, Black
Crataegus crus-galli	Cockspur Thorn
Crataegus mollis*	Hawthorn, Downy
Crataegus monogyra	Hawthorn, Oneseed or English
Crataegus sp.	Hawthorn

(Continued)

TABLE 5. Continued

Euonymus atropurpurea*	Burning Bush
Euonymus europaeus	Spindle tree
Fraxinus profunda	Ash, Pumpkin
Gleditsia triacanthos*	Honey-Locust
Lindera benzoin	Spicebush
Liriodendron tulipifera	Tuliptree or Poplar, Yellow
Malus angustifolia	Apple, Southern Crab
Malus coronaria	Apple, Sweet Crab
Populus deltoides	Cottonwood, Eastern
Prunus virginiana	Cherry, Choke
Quercus bicolor	Oak, Swamp White
Quercus palustris	Oak, Pin
Quercus shumardii	Oak, Shumard
Salix babylonica*	Willow, Weeping
Staphylea trifoliata	Bladdernut, American
Ulmus americana	Elm, American
Ulmus glabra	Elm, Wych
Ulmus serotina	Elm, September
Viburnum alnifolium	Hobble-bush
Viburnum trilobum*	Highbush-Cranberry
Viburnum trilobum*	Highbush-Cranberry

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THE BIG TREES OF MICHIGAN
33. Picea abies (L.) Karsten
Norway Spruce

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The largest known Norway spruce trees in Michigan are located in Jackson and Ottawa counties in the southern portion of Michigan's lower peninsula. One is considerably taller. The other has a larger girth. Overall, they are close enough to be designated as state co-champion trees.

Description of the species: Spruce trees can be distinguished from other evergreen trees in Michigan by having needle-like leaves which are stiff and not flexible. The leaves are borne singly and are more or less 4-sided (Fig. 1), making them easy to roll between thumb and forefinger. The leaves of hemlocks, firs, and Douglas firs are flattened, soft, and flexible. The leaves of the Norway spruce are usually 1–2 cm long and the large cones (6–15 cm long) have cone scales with finely toothed margins. The cone scales are stiff and woody, and the buds are orange-brown. The secondary branches are pendent, making it possible to recognize the species from a considerable distance.

Location of Michigan's Big Trees: The Jackson County tree is located north of Parma, MI at the home of Fred McNeil, 9498 County Farm Road. To reach the tree, take I-94 to exit 130. At the end of the ramp, go under the underpass and continue north onto Parma Road. Go only 0.2 mi north to County Farm Road and turn right (east). Go 1.4 mi. to Wellman Rd. The tree is in the front yard of the McNeil farmhouse at the intersection of County Farm and Wellman Roads and can be easily seen from the road.

The Ottawa County tree is located north of Spring Lake, MI at the home of Douglas Knight, 18201 Fruitport Road. To reach the tree, take Rt. 31 through Grand Haven, MI. As you come over the drawbridge turn right onto MI 104. At the third traffic light, turn left onto Fruitport Road and go north about 1.5 mi. You will pass the Spring Lake Country Club on your right and go over a small bridge before coming to Kelly St. on your right. Just past Kelly St. is a sign marking Louis Lane. This is the driveway of 18201 Fruitport Road and several other homes. Turn left onto the asphalt driveway. The tree is on the right side of the driveway between Fruitport Road and the house.

Description of Michigan's Big Trees: Both of these trees are healthy and have single solid straight trunks. The Parma tree (Jackson County) was measured by Stephen Johnson and Elwood B. Ehrle on 17 November 2002. Its girth at 4 ½′. above the ground was 175″. The tree was 75′. high and had an average crown spread of 67′. Two large branches come off the trunk at 5′. and a large scar oc-

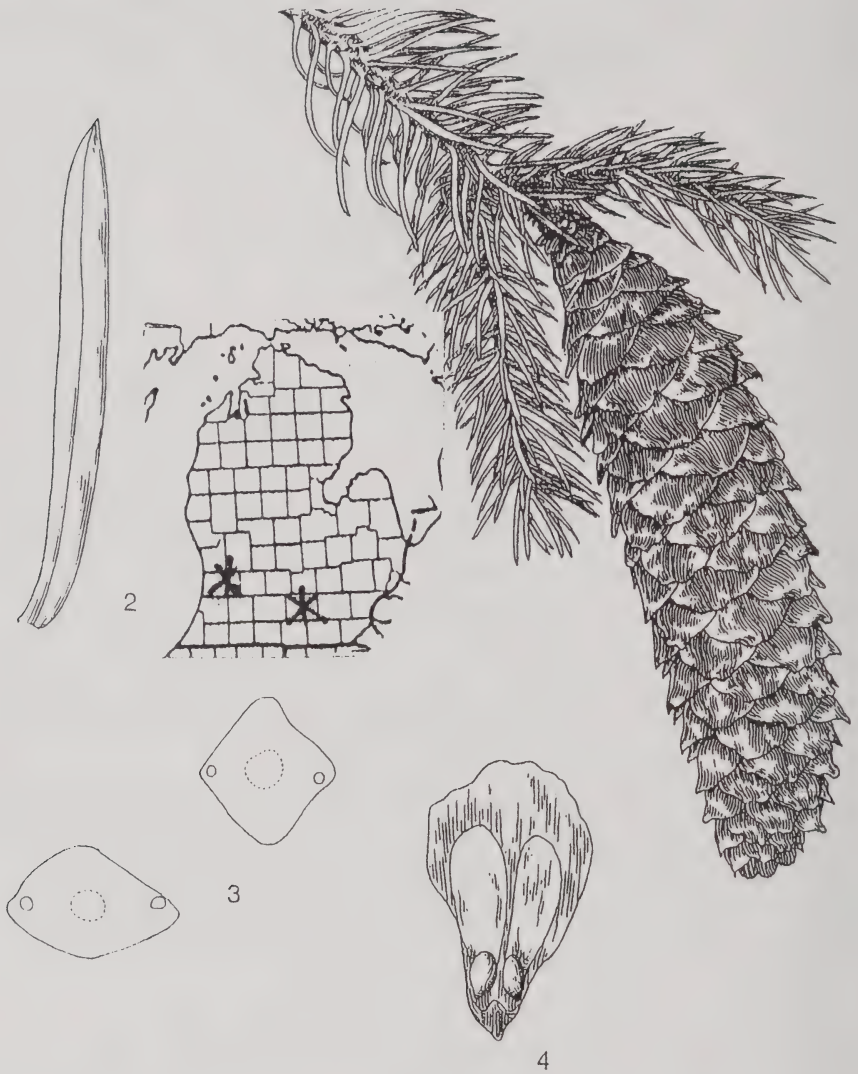

FIGURE 1. Location of Michigan Champion trees and characteristics of the Norway Spruce. Illustrations are from Barnes & Wagner (1981). 1. Shoot with partially opened cone, × ½; 2, Leaf, ×3; 3. Cross sections of leaves, enlarged; 4. Cone scale with seeds, ×1.

curs on the main trunk where a third branch was attached. The tree is somewhat rounded at the top and appears to have lost part of its height sometime in the past.

The Spring Lake tree (Ottawa County) was measured by Douglas Knight and

Elwood B. Ehrle on 20 November 2002. Its girth at 4 ½′ above the ground was 170″. The tree was 93′. high and had an average crown spread of 71′. One major branch arises from the trunk just about 5′. from the ground. The tree is well shaped and has the narrowing spire expected of spruce trees.

INVITATION TO PARTICIPATE

If you would like to join in extending this series of articles by visiting and describing one or more of Michigan's Big Trees, please contact Elwood B. Ehrle for help with the locations, specifications for taking measurements, and assistance with the manuscript. The Michigan Botanical Club encourages your involvement in this activity. Please remember to ask permission before entering private property.

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Barnes, B. V. & W. H. Wagner, Jr. 1981. Michigan Trees: A Guide to the Trees of Michigan and the Great Lakes Region. University of Michigan Press, Ann Arbor. viii + 383 pp.

ANNOUNCEMENT

The University of Michigan Press has announced that a new edition of the 1981 standard reference will shortly appear:

Burton V. Barnes & Warren H. Wagner, Jr.† Michigan Trees, Revised and Updated: A Guide to the Trees of the Great Lakes Region, 6 × 9″, ca 400 pp.; 125 drawings, 7 tables, 3 maps Cloth, ISBN 0-472-11352-6, $37.50; Paperback, ISBN 0-472-08921-8, $19.95

Publication date: September 2003
Several species have been added, as well as sections on tree ecology and fall color. Written and illustrated in a style that appeals to academic botanists and armchair dendrophiles alike, Michigan Trees has long been an indispensable reference, and all botanists in the Great Lakes area will look forward to a revised and updated version. When it appears, it may be ordered directly from the University of Michigan Press website, www.press.umich.edu. They accept MasterCard and Visa. Telephone orders (with credit card in hand) at 800. 621. 2736.

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On the cover: *Elwood B. "Woody" Ehrle measures a white oak tree (13′ 2″ in girth) on the campus of Western Michigan University, Kalamazoo, February 1998. The tree is estimated to be 290 years old, but it is not the state champion, which is in Allegan County, MI.*

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ALLELOPATHY IN *RHAMNUS CATHARTICA*, EUROPEAN BUCKTHORN

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ABSTRACT

Rhamnus cathartica L., common or European buckthorn, is a thoroughly naturalized introduction in much of the United States and southern Canada. Since the mid-19th century, when *R. cathartica* was introduced into Wisconsin as an ornamental hedge, it has spread extensively, colonizing disturbed forest and savanna habitats. In this study, allelopathy was examined as one contributing factor to the invasive character exhibited by *R. cathartica* by measuring the effects of plant exudates obtained from fruit, leaves, bark, and roots on seed germination in alfalfa (*Medicago sativa* L.). The data show that the exudate from the drupes exerts the greatest inhibitory effect on seed germination, with less effect by leaf exudate. Bark and root exudates show no significant effects on seed germination.

INTRODUCTION

The genus *Rhamnus* includes about 100 species (Gleason & Cronquist 1991); four species occur in Wisconsin: *Rhamnus alnifolia* L'Hér., *R. cathartica* L., *R. frangula* L., and *R. lanceolata* Pursh var. *glabrata* Gleason (WIS 2002). *Rhamnus cathartica* and *R. frangula* are non-native, originating from Eurasia, but widely naturalized.

Rhamnus cathartica, common or European buckthorn, the subject of this study, is adapted to mainly well-drained upland soils, while *R. frangula* establishes more frequently in wetlands. The floristic rating for *R. cathartica* as a "wetlands indicator" species is low, being designated FACU (facultative upland), with an estimated probability occurrence in non-wetlands of 67%–99% (WIS 2002). *R. frangula,* which is rated FAC+ (facultative), is equally likely to occur in wetlands or non-wetlands with an estimated probability 34%–66%. Both species are aggressive pioneer competitors that can form crowded thickets that exclude native plants, thereby constituting a threat to Wisconsin's native flora (Kline 1999; Taft & Solecki 1990; WDNR 2002).

Rhamnus cathartica is distributed mainly in the southern half of Wisconsin, readily colonizing disturbed woodland understories, notably open oak forests and savanna habitats (Fig. 1). Kline (1999) refers to *R. cathartica* as "an obnoxious weed—the shrub equivalent of purple loosestrife." The species regularly naturalizes in thickets, hedgerows, old fields, pastures, and roadsides. In old fields of central New York State, however, Gill and Marks (1991) report that post-dispersal predation and frost heaving make *R. cathartica* establishment a "very low probability event." Nonetheless, our observations of *R. cathartica* in Green Lake County (east central Wisconsin) show that the plant is quite com-

FIGURE 1. Invasive understory of *Rhamnus cathartica* in oak woods at Highknocker Park, Green Lake, WI (5 January 2003).

mon in various disturbed habitats, including an abandoned apple orchard (Fig. 2).

From the time of its introduction to North America as an ornamental in the mid-19th century, *R. cathartica* has spread extensively, ranging west from Nova Scotia to Saskatchewan, south to Missouri and east to Virginia (Fig. 3). As early as 1849 both *R. cathartica* and *R. frangula* were planted in Wisconsin as hedgerow cultivars (WDNR 2002). Just as with *R. frangula, R. cathartica* is an alternate host to crown rust, a fungal parasite of oats, as well as the soybean aphid, which overwinters in the buds of *R. carthartica* (Ginns 1986; Hartzler & Pope 2002)

Gleason & Cronquist (1991) describe *R. cathartica* as a shrub or small tree growing in height to six meters. Short thorns terminate some of the branches; the leaves are elliptical and mostly opposite, 3–6 centimeters in length, with finely serrated margins. Three to four pairs of raised secondary veins converge near the blade apex. The unisexual flowers are 4-merous and open with the leaves, May through June. The fruit is a dark purple or black-colored fleshy drupe, 5–6 mm in diameter, typically containing four stones (Figures 4 and 5). Unlike native woody plants, the green foliage of *R. cathartica* persists well after the first frosts, thus making it highly visible and easy to identify.

Several factors contribute to the success of *R. cathartica* outside its native range: lack of natural predators; wide habitat tolerance; rapid growth rate and vigorous vegetative regeneration; prolific fruit/seed production and potential for long-distance seed dispersal; and phenotypic plasticity that enables *R. cathartica*

FIGURE 2. Colonies of *Rhamnus cathartica* in an abandoned apple orchard (5 January 2003).

to exploit varying environmental conditions, notably in its response to light (Gale 2000; WDNR 2002).

Since the leaves of *R. cathartica* emerge earlier and senesce later, they are present an average 58 days longer compared to that of two native species, *Cornus racemosa* Lam. and *Prunus serotina* Ehrh. (Harrington et al. 1989). Thus, besides maximizing light for photosynthesis by an extended growing season, *R. cathartica* can eventually shade out native groundlayer species that develop after buckthorn leafs out (Dugal 1992; Gourley & Howell 1984). Furthermore, high densities of seeds beneath parent trees can result in 162 to 215 buckthorn seedlings/m^2, or more than 2 million seedlings/hectare (Moriarty 1998). The impact on native plant communities by dense groundcovers of *R. cathartica* is potentially devastating.

In addition to competing for space, nutrients, and light, decomposition of *R. cathartica* leaf litter may further contribute to its ability to dominate disturbed habitats. Heneghan et al. (2002) report that rapid decomposition of buckthorn leaf litter, which is high in nitrogen, can modify soil fertility to the degree that increased soil nitrogen may favor buckthorn growth.

Reproduction by *R. cathartica* is primarily by seed with great potential for long-distance dispersal by frugivorus songbirds, the main dispersal agents. The drupes are ingested when alternative food sources become scarce (Gourley & Howell 1984). The presence of anthraquinone in the fruit functions as a laxative, permitting swift passage of the seed, presumably before seed viability diminishes (Archibold et al. 1997).

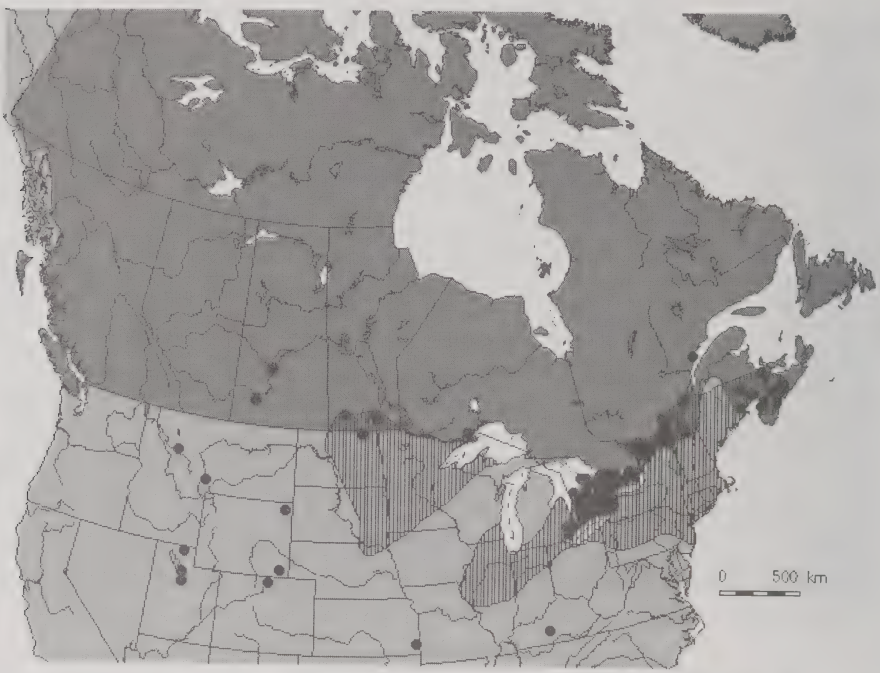

FIGURE 3. Distribution of *Rhamnus cathartica* in North America. The single-hatched areas represent regions where *R. cathartica* is cited in floras and other literature sources. The small circles and solid dark areas represent recent and historic collections, as well as sight and literature records (IPCAN 2002).

Allelopathy

Allelopathy, the chemical inhibition of one species by another, has also been suggested as a factor contributing to the invasive character exhibited by *R. cathartica* (Heidorn 1991). At Pipestone National Monument, Minnesota, Boudreau and Wilson (1992) report that allelopathic compounds within the fruit and leaves might function to inhibit seed germination and growth by other plants. Similar conclusions by Krebach and Wilson (1996) suggest that the fruit of *R. cathartica* contains allelochemicals that may retard growth by competing plants. Krebach noted that fruit exudates obtained in the summer and fall inhibited germination of ryegrass (*Lolium* sp.) seeds, but after frost the fruits no longer had any noticeable effects (Dr. C. Wilson, personal communication, 17 June 2002). According to Wilson (personal communication), young buckthorn leaves do not exert as strong an allelopathic effect as was observed through the summer and fall.

Krock and Williams (2002) examined the effects of leaf and root tissue exudates from *R. frangula* (glossy buckthorn), another invasive exotic. They measured the effects of exudates on seed germination and growth in lettuce (*Lactuca sativa* L.) and radish (*Raphanus sativus* L.), but did not observe any evidence of allelopathy. It should be noted, however, that exudates from the fruit of *R. frangula* were not applied in their seed trials.

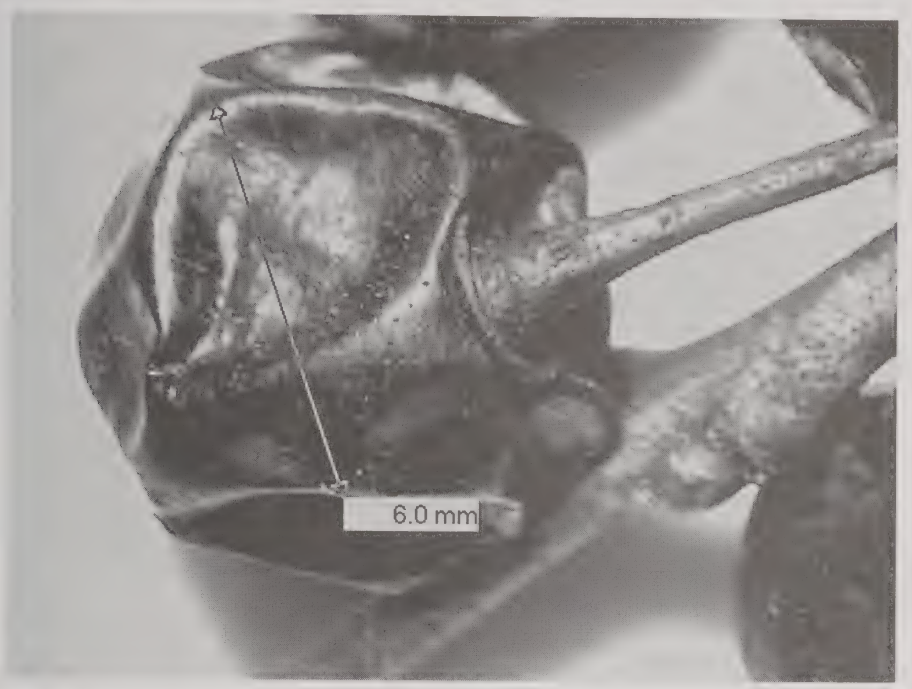

FIGURE 4. Winter drupe of *Rhamnus cathartica* (10×).

In a study of *R. cathartica* near Saskatoon, Saskatchewan, Archibold et al. (1997) report that 90% of the buckthorn fruit eventually falls beneath the parent trees. Moriarty (1998), a wildlife biologist with Hennepin Parks, Minneapolis/St. Paul, reports that there can be about 807 seeds/m^2 beneath mature buckthorn. The seeds remain viable in the soil one to five years (USGS 2002). On the assumption that each drupe contains four stones, this amounts to 202 drupes/m^2, a potentially vast reservoir of allelochemicals. If the drupes do contain allelochemicals, a combination of aggressive colonization and allelopathy via fallen fruits and leaf litter beneath parent trees may be an adaptive strategy for excluding competing species.

There are suggestions of allelopathy in *R. cathartica* by various workers (Heidorn 1991; Boudreau & Wilson 1992; Krebach & Wilson 1996; Larson 2002; Lerman n.d; Coder 1998; B.N.I. 2002), but published studies that measure the allelopathic effects by *R. cathartica* under controlled laboratory conditions are wanting.

We hypothesized that fallen fruits and leaves of *R. cathartica* contain secondary metabolites that intensify interspecific competition by interfering with germination and growth by other species. Based on the literature (Boudreau & Wilson 1992; Krebach & Wilson 1996), we hypothesized that exudates prepared from the drupes and leaves might produce the greatest interference with seed germination by another species.

FIGURE 5. The four one-seeded stones of a typical drupe in *Rhamnus cathartica* (10×).

METHODS

In this investigation we 1) studied what parts of *R. cathartica* produce the greatest (and least) allelopathic effects on seed germination by another species, and 2) examined the effects on germination by seeds treated with varying exudate concentrations from different parts of *R. cathartica.*

Fresh plant material from *R. cathartica* was collected from three different locations in Green Lake County, Wisconsin. Exudate sources included drupes, leaves, bark, and roots. Drupes, leaves and bark were collected in the fall and separately bagged, while roots were collected in the spring.

Samples of plant parts from the three different locations were combined, weighed, and then fully dried to determine the original moisture content. The percentage water content for each part is: drupes, 51.2%; leaves, 69.5%; bark, 37.8%; and roots, 17.1%.

Full-strength (100% concentrate) exudates were prepared by processing the plant material in a food blender, then eluting the mixture with a minimum volume of distilled water. The weight ratio of plant material to distilled water was: drupes, 2:1; leaves, 1:2; bark, 1:2; and roots, 1:1. The percentage of distilled water added to each part included: drupes, 26%; leaves, 66%; bark, 69%; and roots, 52%.

Solutions from the blended mixtures were obtained by squeezing the macerated pulp to collect the exudate, which was then suction-filtered with a vacuum pump. For comparison of exudates obtained at different temperatures, filtrates were prepared at room temperature (18–20°C) and in a warm waterbath (49–51°C). Exudates were refrigerated until used.

The average pH of exudates from each part was: drupes, pH 5.2; leaves, pH 6.5; bark, pH 3.4; and roots, pH 5.0.

Alfalfa (*Medicago sativa*) seed was used to test the effects of *R. cathartica* allelopathy on germination because of its availability, uniformity, and fast germination time. We agree with Inderjit

(1996) that the "allelopathic bioassay must be ecologically realistic . . ." and that "experiments must be designed with conditions resembling those found in natural systems." However, for the scope of this investigation we chose *M. sativa,* a non-native species for the reasons cited above. Our objective was to determine if exudates from *R. cathartica* exhibit an allelopathic effect on *any* seed germination; measuring effects of exudates on native plants remains an objective for the future.

Seeds were placed on cut paper toweling in Petri dishes (100 seeds/dish/10 trials) and treated with 50 drops (3.4mL) of varying exudate concentrations (25%, 50%, 75%, 100%) from each plant part. Seeds moistened with distilled water served as a control. All germination dishes were placed in a lighted Climatarium at a temperature between 24-30°C for five days, and then sprouts counted.

Seed germination data from exudates obtained from room temperature and warm waterbath preparations were combined when it was determined that minor statistical differences (in the leaves) to no statistical differences in other plant parts could be detected. There were 2000 seeds tested for germination per control and for each exudate source per concentration.

RESULTS AND DISCUSSION

A summary of the data shows that exudates from the drupes of *R. cathartica* exhibit the greatest inhibitory effect on alfalfa seed germination (Table 1; Fig. 6). Moreover, a marked decrease in seed germination corresponds with an increase in exudate concentration, e.g. at 100% concentration, 1 seed per 2000 germinated. Exudates from the leaves of *R. cathartica* also demonstrate mild allelopathic effects on seed germination, while the effects of exudates from bark and roots were slight to none.

Analyses (InStat 1998) of germination by seeds treated with varying exudate concentrations from each source (drupes, leaves, bark, roots) were conducted using nonparametric repeated measures ANOVA (Friedman test). Increased concentrations of exudates from drupes and leaves, which produced notable inhibition of seed germination, measure P values far below the threshold (0.05). Thus, variation is significantly greater than expected by chance, or to put it another way, there is a high probability that increased exudate concentrations account for decreased seed germination.

Exudates obtained from bark and roots, however, measure above the P value threshold (0.05). Increasing bark and root exudate concentrations do not appear to decrease seed germination. Dunn's multiple comparisons test (post-test) on seed germination variance among the different exudate concentrations closely agrees with the Friedman test results. The P values generated by the Friedman test for each exudate source are shown in Table 2.

We also investigated seed germination data variance among drupes, leaves,

TABLE 1. Summary of alfalfa seed germination trials

	Total Seeds Germinated/Exudate Concentration				
Exudate Source	Control	25%	50%	75%	100%
Drupes	1846	1708	256	45	1
Leaves	1864	1853	1718	1432	1167
Bark	1877	1860	1842	1823	1802
Roots	1851	1854	1859	1861	1837

[1]Based on 2000 seeds per trial

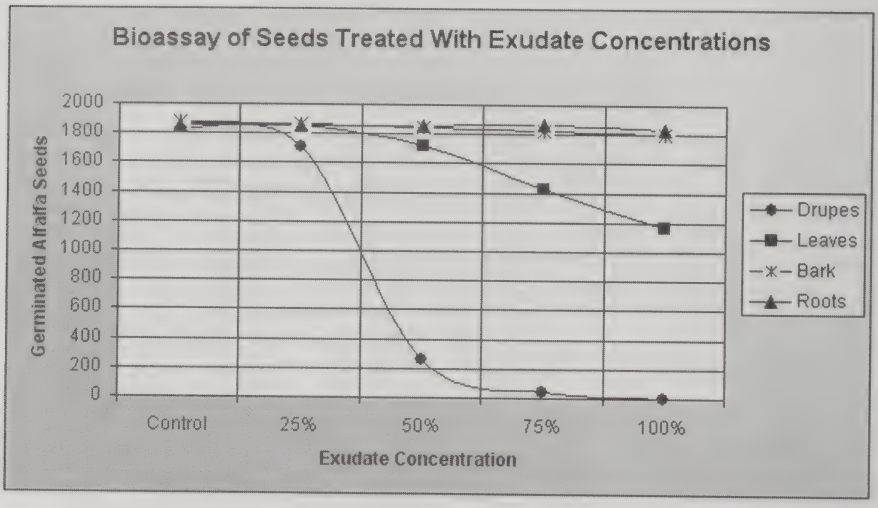

FIGURE 6. Effect of various exudates and concentrations on germination of alfalfa seeds.

bark, and roots. Table 3 summarizes statistics (e.g. mean, SD, SEM, median) for the average total seeds germinated per exudate source. Based on nonparametric repeated measures ANOVA (Friedman test) of the seed germination data variance among drupes, leaves, barks and roots, the P value equals 0.0016, which is considered very significant. In other words, the null hypothesis is rejected and variations among the germination data are significantly greater than expected by chance. Again, a post-test (Dunn's) corresponds closely with the Friedman test, i.e., variance is significantly greater than by chance alone.

In addition to testing variance produced by different plant part exudates, the effect on germination by exudates prepared from "cold" and "warm" baths was examined. Paired *t* tests that compare results among seeds treated with exudates from cold and warm water baths show no significant differences among drupes, bark, and roots. In leaves, however, seed germination from cold- and warm-extracted exudates reveals a modest statistical difference in germination results (Table 4; Fig. 7). Note that the P value of "Leaves" is 0.0494, slightly below the threshold value of 0.05.

TABLE 2. Friedman test results comparing exudate concentrations on alfalfa seed germination.

Drupes	P value < 0.0001, considered extremely significant. Variation is significantly greater than expected by chance.
Leaves	P value < 0.0001, considered extremely significant. Variation is significantly greater than expected by chance.
Bark	P value = 0.1185, considered not significant. Variation is not significantly greater than expected by chance.
Roots	P value + 0.4821, considered not significant. Variation is not significantly greater than expected by chance.

TABLE 3. Statistical summary for the average total seeds germinated per exudate source.

Seed Germination Summary	Drupes	Leaves	Bark	Roots
Mean	770.9	1606.8	1840.8	1852.4
Standard Deviation	924.77	301.29	29.592	9.476
Sample Size*	5	5	5	5
Standard Error of Mean	413.57	134.74	13.234	4.238
Lower 95% confidence limit	–377.17	1232.8	1804.1	1840.6
Upper 95% confidence limit	1919.0	1980.8	1877.5	1864.2
Minimum	0.5000	1167.0	1802.0	1837,0
Neduab (50th percentile)	255.50	1718.0	1842.0	1854.0
Maximum	1846.0	1864.0	1877.0	1861.0
Normality test KS	0.3113	0.2440	0.1418	0.2413
Normality text P value	>0.10	>0.10	>0.10	>0.10
Passed normality test?	Yes	Yes	Yes	Yes

*Sample size is based on five trials (Control, 25%, 50%, 75%, 100%) with each trial consisting of 2000 seeds tested, i.e. total 10,000 seeds per exudate source.

TABLE 4. Paired *t* test results comparing effects of cold-water-extracted versus warm-water- extracted exudates on germination.

Exudate Source	T value	Two-tailed P value
Drupes	0.3638 with 4 degrees of freedom	0.7344
Leaves	2.787 wih 4 degrees of freedom	0.0494
Bark	2.389 with 4 degrees of freedom	0.0752
Roots	0.8480 with 4 degrees of freedom	0.4442

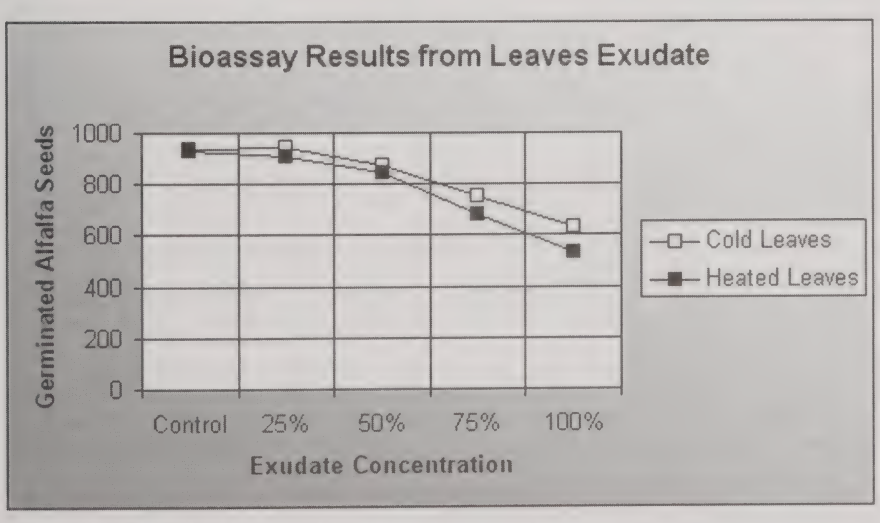

FIGURE 7. Effects of cold-extracted versus warm-extracted exudates.

CONCLUSIONS AND FUTURE STUDIES

In this study, *R. cathartica* exhibits allelopathy toward seed germination in alfalfa, *Medicago sativa.* The data show that the exudate from the drupes exerts the greatest inhibitory effect on seed germination, with less effect by leaf exudate. Bark and root exudates show no significant effects on seed germination.

We recommend that future studies of allelopathy in *R. cathartica* incorporate experimental designs that demonstrate allelopathy as an essential ecological mechanism of plant interference by the following: 1) isolate and identify allelopathic compounds, 2) account for the significance of exudate mixtures, because according to Einhellig (1995) the chances of only one compound causing allelopathic effects are remote, 3) collect data on the fate and persistence of allelochemicals in soil and their interactions with abiotic and biotic factors of the natural environment, and 4) obtain and test exudates from plant parts throughout the growing season to improve understanding of the temporal aspect of allelopathy.

For comparison, we recommend that future investigations include similar bioassay studies on allelopathy in *R. frangula,* which like *R. cathartica* exhibits weedy tendencies. Laboratory bioassays (Krock & Williams 2002) indicate that exudates from leaf and root tissues of *R. frangula* produced stimulatory, not inhibitory effects on seed germination in *Lactuca sativa* and *Raphanus sativus.* However, the allelopathic effects by drupe exudates from *R. frangula* were not investigated.

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BOOK REVIEW

WILD ORCHIDS OF NORTH AMERICA, North of Mexico. Paul M. Brown; drawings by Stan Folsom. Cloth, ISBN 0-8130-2571-0, $49.95; Flexibind, ISBN 0-8130-2572-9, $27.95. University Press of Florida, 15 NW 15th Street, Gainesville, Florida 32611; www.upf.com, complete with shopping cart and credit card options.

There are so many orchid books, you might think the subject had been exhausted. Not so. This one is graced with both detailed line drawings and color photographs, arranged alphabetically by scientific names, with common names also given. The whole thing is very thoroughly indexed as well. The descriptive remarks are very brief. Literature references are given in abundance.

There is a "field key" to permit identification in the wild. And there is an extensive appendix, pp. 187-196, comprising "Additions, Corrections, Nomenclatural Changes, and Comments for Luer (1972), *The Native Orchids of Florida*, and Luer (1975), *The Native Orchids of the United States and Canada excluding Florida.*" This serves to bring those volumes up to date.

While you are at the website, you will want to consider ordering the companion volume, *Wild Orchids of Florida.* It's just $24.95 in paperback, $50 in cloth. Both books are offered at nicely discounted prices at amazon.com.

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THE AQUATIC VEGETATION OF THE OLD WOMAN CREEK NATIONAL ESTUARINE RESEARCH RESERVE (HURON, OHIO): A LAKE ERIE COASTAL WETLAND

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ABSTRACT

A floristic survey and macrophyte study of the Old Woman Creek National Estuarine Research Reserve (OWC), a 56-hectare coastal wetland located in the western basin of Lake Erie, was conducted between 1993 and 1995 with limited follow-up surveys in 1996 and 1997. The survey was done to document the relatively unstudied vegetation of OWC as well as provide a review of historical change in species composition. During the multi-year survey, 143 aquatic and wetland plant species were recorded. This represents an increase of 39 documented species since the prior 1974 floristic survey. Notable changes since 1974 include the decline of the submerged species *Potamogeton pectinatus* and the emergent *Peltandra virginica.* Areas previously occupied by *P. pectinatus* and other submerged species, and the emergents *Typha* spp., *Scirpus fluviatilis,* and *P. virginica* have been replaced by extensive monotypic beds of *Nelumbo lutea* and *Phragmites australis.* Additional changes include the growth and distribution of *Ceratophyllum demersum* throughout the estuary and a first record of the exotic and highly invasive submersed species *Myriophyllum spicatum.* Change in species composition and abundance appear to be driven by water level fluctuations and the ability of certain invasive species to expand in this highly disturbed environment.

INTRODUCTION

The Old Woman Creek National Estuarine Research Reserve (OWC-NERR) and State Nature Preserve (SNP) represents one of the few remaining undeveloped coastal wetland systems along the southern shore of Lake Erie. Coastal wetlands once prevalent in Lake Erie's Western Basin have disappeared through the combined effects of natural shoreline disturbance and cultural impacts.

Old Woman Creek is often referred to as a freshwater estuary as first described by Leverett and Taylor (1915) and more recently by Brant and Herden-

dorf (1972). Bates and Jackson (1980) defined freshwater estuaries of the Great Lakes as the lower portion of a tributary or drowned river mouth, exhibiting an area of mixing between stream and lake water, and directly influenced by meteorological events. Whether Great Lakes estuaries are analogous to "true" estuaries—typified by the mixing of saltwater and freshwater, as categorized by Schubel and Pritchard (1971), is questioned by some (Dyer 1990; Odum 1990; Schubel and Pritchard 1990). Herdendorf (1990) suggested that freshwater estuaries such as OWC are similar in many aspects to marine estuaries, including constriction at the mouth and continuous exchange and mixing of water between two distinct systems. When the mouth of OWC is open, periodic seiche events allow upstream movement of water and subsequent mixing, giving OWC the appearance of many tidal marsh creeks along the Atlantic coast (Dyer 1990).

Great Lakes estuarine wetlands are functionally equivalent to marine counterparts as a transition zone between terrestrial and wetland habitats and the open water of the lakes. Great Lakes and marine estuaries are both highly productive systems (Reeder 1990; Mitsch and Gosselink 1986), providing refuges and spawning areas for many fish, invertebrates, and other organisms. Both support extensive growth of wetland vegetation adapted to continuous fluctuations in water levels and daily variations in water quality. Great Lakes coastal wetlands exhibit relatively diverse populations of emergent, floating and submersed plants. Annual fluctuations in water levels are thought to maintain species diversity, limiting the long-term establishment of extensive monotypic plant stands (Keddy & Reznicek 1985). However, both natural and anthropogenic disturbance to many of these systems has resulted in the elimination of many submersed species and facilitated the invasion of exotic and aggressive plant species (Stuckey 1989).

Numerous historical descriptive studies of the aquatic and wetland flora of Great Lakes coastal wetlands have appeared in the literature (e.g., Keough 1987; Lowden 1969; Marshall 1977; Moore 1973; Reznicek & Catling 1989; Stuckey 1975, 1976). The majority of these studies were reviewed in Stuckey's monograph (1989) on the aquatic and wetland flora of western Lake Erie. However, to our knowledge recent studies do not exist, and therefore our recent study provides the only comprehensive update of the flora in the 1990s.

OWC is an ideal site to study vegetation response to environmental influences and to examine long-term vegetation change in the aquatic and wetland habitats. Since OWC was designated as an NERR and SNP in 1981 there has been no complete floristic inventory of the estuary. Contributing factors to this apparent lack of botanical interest in the OWC flora may be a belief that the site is species-poor or that the relative botanical importance of wetland sites is based on the presence of rare species and not the quality of the coastal wetland ecosystem. Similarly, Reznicek and Catling (1989) in their botanical investigation of Long Point, Ontario wetlands attribute, in part, the previous lack of floristic studies to an assumption by researchers that the work had already been done. In addition, the dynamic aspects of the estuary are also not appreciated fully with respect to vegetation change. Seasonal and long-term vegetation changes are continuous, and continuity in species composition or diversity cannot be assumed.

Floristic inventories provide essential baseline information on the vegetation of OWC, and facilitate future studies of the site and other coastal wetlands along the south shore of Lake Erie. The data presented here are particularly relevant as Lake Erie water levels return to their long-term mean from an extended period of high water levels and OWC macrophyte species composition shifts in response to lower lake levels (Trexel & Francko 2001). These data could also be used to test the idea that major coastal wetland types along the south shore of Lake Erie are floristically similar to OWC, and that continued documentation of species composition and change in response to changes in environmental and biotic variables could provide a theoretical, field-based model for coastal wetland management strategies. This study documents aquatic and wetland vegetation distribution for the period 1993–1995 with supplemental data extending to 1997. We also review historical change in community structure and species composition in OWC.

SITE DESCRIPTION

The present day Old Woman Creek estuary encompasses approximately 56 hectares and drains a watershed of 69 km^2. Its drowned river mouth and sand barrier-beach separating the wetland from Lake Erie characterize this shallow wetland. Water depths in OWC average less than 50 cm but can increase to more than 1 m in response to storm events from the watershed and Lake Erie storm surges. The wetland lies directly east of Sandusky Bay and the mouth of the Huron River, near the southernmost point in the Great Lakes, 41° 22′N, 82° 31′W (Figure 1). Its geographic location is reflected in the floristic composition of the aquatic and wetland plant communities, which contain species with a broad geographical affinity, including a distinct southern component (Stuckey 1989). The southern species *Nelumbo lutea* (American water lotus) is the dominant aquatic macrophyte in OWC, and is widely distributed in the coastal wetlands of Lake Erie's western basin. The presence of *N. lutea* and other southern species is due in part to an area climate moderated by Lake Erie: from the lakeshore to a few kilometers inland, summer and winter temperatures are dampened. The growing season is approximately 200 days, about 30–35 days longer than observed farther inland (Herdendorf 1989).

The physico-chemical environment, wetland hydrology, and selected biological aspects of OWC have been the focus of numerous investigations. The physical environment including the geology, sediment transport and deposition, and biogeochemistry have been studied by Buchanan (1982), Frizado et al. (1986), and Reeder and Eisner (1994); the morphometry and hydrology by Herdendorf and Hume (1991), Herdendorf and Krieger (1989), and Reeder (1990). Biological investigations include wetland fish populations and recruitment (Hoffman 1985; and Rotenberry et al. 1988), macroinvertebrate communities (Krieger & Klarer 1992), and phytoplankton dynamics (Havens 1991; Klarer & Millie 1992). Klarer (1988) and Reeder (1990) have investigated and reported on water quality and nutrient cycling. Krieger (1989) summarizes Lake Erie estuarine sys-

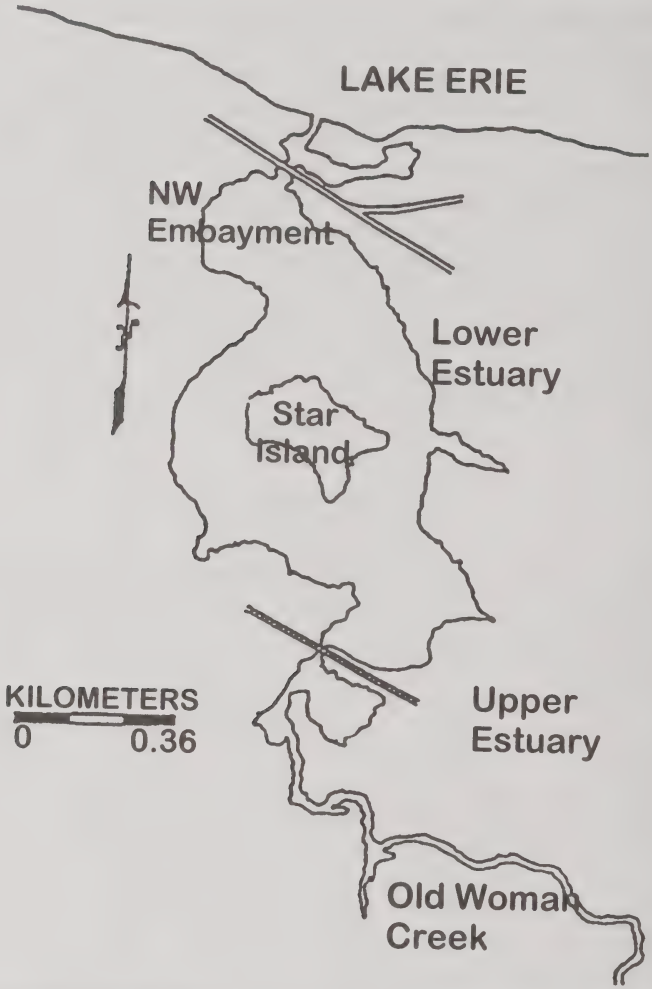

FIGURE 1. Location of the Old Woman Creek estuary on the south shore of Lake Erie.

tems, with an emphasis on the OWC environment. While these studies do not directly assess the vegetation of the estuary, their findings are important for a better understanding of vegetation dynamics and overall wetland function.

VEGETATION HISTORY

Mosley (1899) and Pieters (1901) were the first to document and describe the vegetation of Lake Erie's western basin and the Sandusky Bay area. Stuckey (1989) and Gordon (1969) provided historical reviews of the aquatic vegetation

and documented changes in species composition and abundance. Marshall (1977) was the first to conduct a comprehensive floristic survey of OWC, including the surrounding upland. Klarer and Millie (1992), using aerial photographs for the periods of 1984–1985 and 1988–1989, documented change in the distribution of *Nelumbo lutea* throughout the estuary. The Cleveland Museum of Natural History maintains a partial plant list compiled from periodic surveys of the estuary in 1988 (Jim Bissell, pers. comm.). Aerial photographs of OWC from as early as 1937 through the present provide an accurate record of aquatic plant coverage and community types, although species identification from these photographs is speculative at best. Analysis of sediment cores provides a glimpse of postglacial vegetation, indicating an extensive wetland environment dominated by *Typha,* Cyperaceae, Nymphaeaceae, and graminoids (Reeder 1994). OWC's designation as a SNP and NERR has greatly enhanced on-site research efforts, and facilitated the documentation of the dominant vegetation in the estuary (Klarer & Millie 1992).

Earlier literature and herbarium records suggest that the present-day floristic structure of OWC has changed markedly (Marshall & Stuckey 1974; Marshall 1977; Klarer & Millie 1992). Since the early 1970s, the estuary has shifted from a predominantly emergent community dominated by *Peltandra virginica* and *Polygonum amphibium* to an open water community dominated by *Nelumbo lutea* (Klarer & Millie 1992). *Nelumbo lutea* has expanded from a few beds covering less than 10 percent of the estuary, as found in the 1970s, to extensive beds with an areal cover of about 35 to 36 percent in 1993, 1994, and 1995 (Whyte 1996; Whyte et al. 1997). Also significant is the appearance of the submerged macrophytes *Ceratophyllum demersum* and *Myriophyllum spicatum,* and the presence of *Phragmites australis. Potamogeton pectinatus* has periodically appeared and disappeared since 1974; the dense beds found in the northwest embayment in 1974 disappeared during the high water years of the mid-1980s, and subsequently returned in 1989. Overall, species richness has increased, although the number of species considered rare or occasional has increased, and the number of species common and abundant has decreased (Figure 2). The latter may be due in part to the extensive monotypic beds of *N. lutea* and *P. australis* presently found in the estuary.

METHODS

Floristic Survey

The aquatic and wetland vegetation of OWC was surveyed in the spring and summer of 1993, 1994 and 1995, with less extensive surveys in 1996 and 1997. Ground surveys were complemented with aerial photography in late July or early August for each of the first three years. Areas surveyed included wetland plant communities in areas of open water, the immediate shoreline, and the sand barrier-beach. Voucher specimens were collected for all reported species, and were deposited in the Willard Sherman Turrell Herbarium of Miami University, Oxford, Ohio (MU). To facilitate the examination of recorded species by other investigators, duplicate specimens were collected for many of the reported species for deposit at the OWC-NERR, Huron, Ohio.

Quantitative sampling of aquatic vegetation in the northwest embayment (of the lower estuary) was done in August of each year of the study period ('93–'95 and '97) utilizing standard transect sampling procedures for aquatic and wetland vegetation (as described by Titus 1993). Nine transects

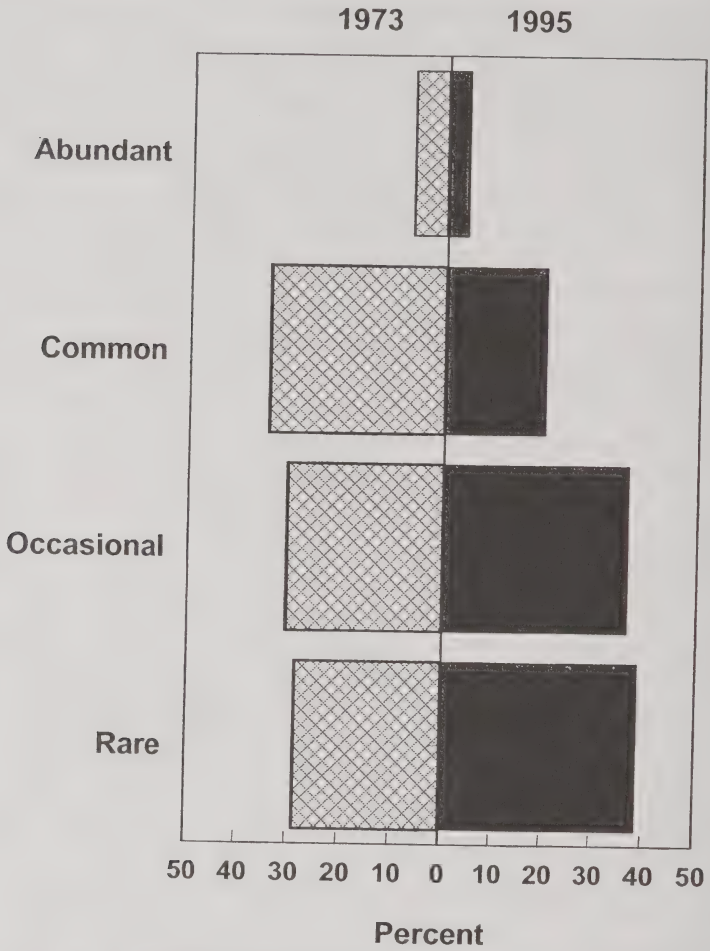

FIGURE 2. Change in species abundance between the initial floristic survey completed in 1974, and the survey completed in 1995.

spaced 60 meters apart were placed perpendicular to the shore extending into the open water. The initial transect position was randomly determined within a 50 meter segment of shoreline of the northeast corner of the embayment. Species presence was recorded in 0.25 m^2 quadrats placed every three meters along each transect. This method was used in order to map the existing vegetation and to document change in species distribution during the study period.

Peak biomass data (grams dry-weight/m^2) were obtained in August of 1995 for submerged species, the emergent species *Phragmites australis* and *Scirpus fluviatilis* (River bulrush), and the floating-leaved plant *Nelumbo lutea.* Biomass was determined for submerged species by randomly tossing a circular 0.5m^2 quadrat within the nearshore and open water of the northwest embayment of the lower estuary. Within each circular quadrat, a 0.25m^2 sample of submerged vegetation was harvested. Fifteen samples were obtained in the nearshore zone and 10 samples in the open water. Quadrats of 0.5m^2 were randomly placed in selected stands of *P. australis* and *S. fluviatilis,* and 1m^2 quadrats in a single large bed of *N. lutea.* All plant material was washed of debris and oven-dried at 105°C.

FLORA OF OLD WOMAN CREEK

Overview of the Flora

For the period 1993–1995, 143 aquatic and wetland species were documented. Most species were widespread, but the number of abundant species was limited (Table 1). The list of species includes 50 families and 101 genera. The Cyperaceae and Poaceae were the largest families, represented by 16 and 15 species respectively. Two species are listed as endangered (Ohio), and one as potentially threatened. Overall the number of documented species represents an increase of 39 species from Marshall's initial survey completed in 1976; 64 represent new species not documented by Marshall, and 25 previously documented species were not found in the most recent study.

The flora of OWC exists within a highly disturbed environment. Fluctuating Lake Erie water levels as well as human disturbances including agriculture, rail and road construction, and development in the watershed have likely altered the species composition. Of the 143 identified species, 15 or about 10% are considered aliens.

The aquatic and wetland vegetation of OWC consists of submerged, floating-leaved, and free-floating communities in open water areas of a depth generally less than 1 meter, and predominantly sedges, grasses and emergents along the shoreline on exposed mudflats or shallow water of less than 10 centimeters.

For the period of study, open water habitat dominated the estuary and includes the creek and surrounding floodplain. The entire lower portion of the creek was flooded, extending from Lake Erie to south of the railway. Herdendorf (1989) refers to remnant embayment marshes, which are all that remain of the once extensive marsh habitat that existed prior to the current period of high water. Shoreline areas, including the remnant marsh areas represented the most diverse habitat in the estuary and exhibited the greatest seasonal and annual change in species composition. Vegetation within each of the shoreline communities consisted predominantly of emergents, grasses and sedges, and pioneer annuals able to survive seasonal disturbances. Within each of the described habitats there exists some overlap of plant species, generally resulting from short-term fluctuations in water level.

Additional plant communities found on the periphery of OWC include areas of wet woods drained by seasonally flowing streams along the east shore, and a more extensive wet lowland (swamp) forest bordering the estuary to the south. Common woody species in these areas are *Cephalanthus occidentalis* (Buttonbush), *Fraxinus americana* (White Ash), *Quercus rubra* (Red Oak), *Crataegus mollis* (Downy Hawthorn), and *Viburnum acerifolium* (Arrowwood). Numerous herbaceous species appear on the forest floor early in the growing season and include *Boehmeria cylindrica* (False nettle), *Caltha palustris* (Marsh marigold), *Cardamine bulbosa* (Bitter cress), *Cardamine douglassii* (Purple bitter cress), *Laportea canadensis* (Wood nettle), *Floerkea proserpinacoides* (False mermaid), *Senecio aureus* (Golden ragwort), *Anemonella thalictroides* (Rue anemone), *Viola sororia* (Common blue violet), *Arisaema triphyllum* (Jack-in-the-pulpit), and several species of *Ranunculus* (Buttercup), the most common

TABLE 1. Comparison of species composition and abundance of aquatic and wetland plants reported for Old Women Creek in 1974–1976 and 1993–1995. Years in which a species was not reported are indicated by a blank space.

		Presence/Abundance***		
Family	Species*	1974–1976**	1993–1995	Origin
Aceraceae	Acer saccharinum	occasional	occasional	N
Acoraceae	Acorus americanus	rare	rare	N
Alismataceae	Alisma subcordatum		rare	N
Alismataceae	Sagittaria latifolia	occasional	common	N
Apiaceae	Cicuta maculata	rare	rare	N
Apiaceae	Sium suave		occasional	N
Araceae	Arisaema triphyllum		occasional	N
Araceae	Peltandra virginica	abundant	occasional	N
Asclepiadaceae	Asclepias incarnata	common	occasional	N
Aspleniaceae	Athyrium filix-femina		rare	N
Aspleniaceae	Dryopteris carthusiana		rare	N
Asteraceae	Aster lanceolatus		rare	N
Asteraceae	Bidens cernua	common	common	N
Asteraceae	Bidens connata	occasional	occasional	N
Asteraceae	Bidens frondosa	common		N
Asteraceae	Bidens laevis	occasional		N
Asteraceae	Eclipta prostrata	rare	occasional	N
Asteraceae	Eupatorium perfoliatum	occasional	occasional	N
Asteraceae	Rudbeckia laciniata		rare	N
Asteraceae	Senecio aureus		rare	N
Asteraceae	Vernonia gigantea	occasional		N
Balsaminaceae	Impatiens capensis	abundant	common	N
Balsaminaceae	Impatiens pallida	rare	rare	N
Brassicaceae	Alliaria petiolata		occasional	A
Brassicaceae	Barbarea vulgaris		common	A
Brassicaceae	Cardamine bulbosa		occasional	N
Brassicaceae	Cardamine douglassii		rare	N
Brassicaceae	Cardamine pensylvanica	common	common	N
Brassicaceae	Rorippa palustris	common	common	N
Butomaceae	Butomus umbellatus	rare		A
Campanulaceae	Lobelia cardinalis		rare	N
Campanulaeae	Lobelia siphilitica	occasional	occasional	N
Caprifoliaceae	Sambucus canadensis	occasional		N
Ceratophyllaceae	Ceratophyllum demersum	rare	common	N
Convolvulaceae	Calystegia sepium	common	occasional	N
Cornaceae	Cornus amomum		rare	N
Cornaceae	Cornus drummondii	common	common	N
Cornaceae	Cornus stolonifera		rare	N
Cucurbitaceae	Echinocystis lobata	common	occasional	N
Cyperaceae	Carex comosa		occasional	N
Cyperaceae	Carex complanata		rare	N
Cyperaceae	Carex crinita		rare	N
Cyperaceae	Carex crus-corvi		rare	N(E)
Cyperaceae	Carex frankii	rare	rare	N
Cyperaceae	Carex grayi		occasional	N
Cyperaceae	Cyperus erythrorhizos		common	N
Cyperaceae	Cyperus esculentus	occasional		N
Cyperaceae	Cyperus odoratus	common	common	N
Cyperaceae	Cyperis rivularis	rare		N
Cyperaceae	Cyperus strigosus	occasional	occasional	N

TABLE 1. Continued

Family	Species*	Presence/Abundance*** 1974–1976**	1993–1995	Origin
Cyperaceae	Eleocharis ovata		rare	N(E)
Cyperaceae	Scirpus americanus	rare	rare	N
Cyperaceae	Scirpus atrovirens	occasional	occasional	N
Cyperaceae	Scirpus fluviatilis	common	common	N
Cyperaceae	Scirpus validus	occasional	occasional	N
Fabaceae	Amorpha fruticosa		rare	N
Haloragaceae	Myriophyllum spicatum		occasional	A
Hydrocharitaceae	Elodea canadensis		rare	N
Iridaceae	Iris pseudacorus		rare	A
Iridaceae	Iris versicolor	common	common	N
Juncaceae	Juncus acuminatus		rare	N
Juncaceae	Juncus effusus	rare	occasional	N
Juncaceae	Juncus tenuis	rare	rare	N
Lamiaceae	Lycopus americanus	rare	occasional	N
Lamiaceae	Lycopus europaeus	rare	occasional	A
Lamiaceae	Lycopus uniflorus	occasional	occasional	N
Lamiaceae	Lycopus virginicus	rare		N
Lamiaceae	Mentha arvensis	common	common	N
Lamiaceae	Mentha ×gentilis	rare		N
Lamiaceae	Prunella vulgaris	common	occasional	A
Lamiaceae	Scutellaria epilobiifolia	common	occasional	N
Lamiaceae	Scutellaria lateriflora	common	common	N
Lamiaceae	Stachys hispida	occasional		N
Lamiaceae	Stachys tenuifolia		occasional	N
Lamiaceae	Teucrium canadense	occasional	rare	N
Lemnaceae	Lemna minor	abundant	abundant	N
Lemnacea	Spirodela polyrhiza	abundant	occasional	A
Limnanthaceae	Floerkea proserpinacoides		rare	N
Lythraceae	Decodon verticillatus	occasional	occasional	N
Lythraceae	Lythrum salicaria		rare	A
Malvaceae	Hibiscus moscheutos	common	common	N
Nelumbonaceae	Nelumbo lutea	abundant	abundant	N
Nymphaeaceae	Nuphar advena	occasional	rare	N
Nymphaeaceae	Nymphaea tuberosa	common	common	N
Onocleaceae	Onoclea sensibilis	occasional	rare	N
Onagraceae	Circaea quadrisculata		rare	N
Onagraceae	Epilobium ciliatum		rare	N
Onagraceae	Epilobium glandulosum	occasional		N
Onagraceae	Ludwigia palustris	rare	occasional	N
Osmundaceae	Osmunda cinnamomea	occasional		N
Platanaceae	Platanus occidentalis		rare	N
Poaceae	Agrostis stolonifera	occasional		N
Poaceae	Calamagrostis canadensis	occasional		N
Poaceae	Calamagrostis canadensis	occasional		N
Poaceae	Calamagrostis canadensis	occasional		N
Poaceae	Cinna arundinacea	rare	occasional	N
Poaceae	Echinochloa crusgalli	rare	occasional	A
Poaceae	Echinochloa muricata	occasional		N
Poaceae	Echinochloa walteri	rare	common	N
Poaceae	Elymus virginicus	occasional		N
Poaceae	Glyceria striata	rare	rare	N
Poaceae	Leersia oryzoides	common	common	N
Poaceae	Leersia virginica		occasional	N

(Continued)

TABLE 1. Continued

Family	Species*	Presence/Abundance*** 1974–1976**	1993–1995	Origin
Poaceae	Panicum lanuginosum		rare	N
Poaceae	Phalaris arundinacea	abundant	abundant	Z
Poaceae	Phragmites australis		abundant	Z
Polygonaceae	Polygonum amphibium	common	common	N
Polygonaceae	Polygonum hydropiperoides		occasional	N
Polygonaceae	Polygonum lapathifolium	common	occasional	N
Polygonaceae	Polygonum pensylvanicum	common		N
Polygonaceae	Polygonum persicaria	occasional	common	A
Polygonaceae	Polygonum punctatum	occasional	common	N
Polygonaceae	Polygonum sagittatum	rare	occasional	N
Polygonaceae	Polygonum virginianum		occasional	N
Polygonaceae	Rumex orbiculatus	rare		N
Polygonaceae	Rumex verticillatus	common	common	N
Pontederiaceae	Pontederia cordata		rare	N
Potamogetonaceae	Potamogeton crispus		rare	A
Potamogetonaceae	Potamogeton foliosus		rare	N
Potamogetonaceae	Potamogeton nodosus	rare	rare	N
Potamogetonaceae	Potamogeton pectinatus	common	occasional	N
Primulaceae	Lysimachia ciliata	occasional	rare	N
Primulaceae	Lysimachia nummularia	abundant	abundant	A
Primulaceae	Lysimachia quadriflora	common		N
Ranunculaceae	Caltha palustris	occasional	rare	N
Ranunculaceae	Ranunculus abortivus		occasional	N
Ranunculaceae	Ranunculus fascicularis	common		N(P)
Ranunculaceae	Ranunculus hispidus		occasional	N
Ranunculaceae	Ranunculus recurvatus		occasional	N
Ranunculaceae	Ranunculus repens	common	occasional	A
Ranunculaceae	Ranunculus sceleratus	common	occasional	N
Ranunculaceae	Thalictrum dioicum		rare	N
Ricciaceae	Riccia fluitans		rare	N
Ricciaceae	Ricciocarpus natans		rare	N
Rosaceae	Rosa palustris	common		N
Rosaceae	Rubus odoratus		rare	N
Rosaceae	Spiraea alba	rare		N
Rubiaceae	Galium aparine		rare	N
Rubiaceae	Galium tinctorium	common		N
Salicaceae	Populus deltoides		occasional	N
Salicaceae	Salix amygdaloides		rare	N
Salicaceae	Salix babylonica		rare	A
Salicaceae	Salix exigua		occasional	N
Salicaceae	Salix nigra		rare	N
Saururaceae	Saururus cernuus	rare	rare	N
Scrophulariaceae	Chelone glabra		occasional	N
Scrophulariaceae	Lindernia dubia	rare	occasional	N
Scrophulariaceae	Mimulus alatus		rare	N
Scrophulariaceae	Mimulus ringens	occasional	occasional	N
Scrophulariaceae	Veronica serpyllifolia		occasional	A
Saxifragaceae	Penthorum sedoides	rare	occasional	N
Sparganiaceae	Sparganium eurycarpum	occasional	abundant	N
Typhaceae	Typha angustifolia	rare		Z
Typhaceae	Typha ×glauca		rare	N
Typhaceae	Typha latifolia	occasional	rare	N
Urticaceae	Boehmeria cylindrica	common	common	N

TABLE 1. Continued

Family	Species*	Presence/Abundance*** 1974–1976**	1993–1995	Origin
Urticaceae	Laportea canadensis	common	common	N
Urticaceae	Pilea fontana	occasional		N
Uritcaceae	Pilea pumila	common	common	N
Urticaceae	Urtica dioica		rare	N
Verbenaceae	Verbena hastata	common	common	N
Vitaceae	Vitis riparia	rare	rare	N
Violaceae	Viola sororia	common	common	N
Violaceae	Viola cucullata		common	N
Violaceae	Viola striata	occasional		N
Total	171	106	143	

Nomenclature follows Gleason and Cronquist (1991), for the most part.

*Species status as an aquatic and wetland plant is based upon national wetland status (Reeder 1988), and known occurrence in moist or wet habitat.

**From Marshall (1977).

***Abundance follows Marshall (1977): abundant = several to many individuals in nearly all sites; common = several to many individuals in many sites; occasional = several individuals in more than one site; rare = individuals found in only a single site.

Origin as given in Herdendorf et al. (2001). A = alien species, N =native species, Z =native to North America, naturalized to OWC

Ohio Plant Status (Ohio Division of Natural Areas and Preserves). E = endangered, P = potentially threatened.

taxa being *R. hispidus* (Hispid buttercup) and *R. sceleratus* (Cursed crowfoot). Woody species of the wet woods were not completely surveyed, and surveying of the swamp forest was limited to the backwater channel. A species list of the OWC swamp forest vegetation is available from the Ohio Department of Natural Resources, which monitors this area on an ongoing basis (Jennifer Windus, pers. comm.).

FLOATING-LEAVED MACROPHYTES

Dense, monotypic beds of *Nelumbo lutea* characterize the open water zones of the estuary. *Nelumbo lutea* beds are found in all areas of the estuary, extending from the south basin to north of State Route 6. *Nelumbo lutea* coverage was relatively stable from 1993 to 1995, covering approximately 36% of the estuary surface area, although individual beds were observed to expand or contract. Whyte and Francko (1997) provide a complete description of its distribution in OWC. Beds of *Nelumbo lutea* were generally monotypic, but were occasionally associated with *Nymphaea tuberosa* (White water-lily), *Ceratophyllum demersum, Potamogeton pectinatus,* and *Lemna minor* (Smaller duckweed). Late in the growing season, *L. minor* formed thick mats completely covering the water

surface in the quiet water of the *N. lutea* beds. Conversely, *P. pectinatus* appeared to be shade intolerant, unable to survive in areas where it was encroached upon by *N. lutea* later in the growing season.

Nymphaea tuberosa also occurred throughout the estuary in small patches along protected areas of shoreline. The largest population of *N. tuberosa* was located in the northwest embayment where it occupied numerous beds of about 1–3 m in diameter. These beds were often encroached upon by the larger *Nelumbo lutea* beds, but were not displaced. Observational data and aerial photography in 1995 indicated an expansion of *Nymphaea tuberosa* from 1994 to 1995. This contrasts with a 90 percent decline—from 1994 to 1995—in the number of quadrats observed to contain *Nelumbo lutea* in the northwest embayment. The observed decline resulted from the disappearance of two of the three major beds, 2,929 m^2 and 601 m^2 in area, located in the northwest embayment (Whyte & Francko 1997).

Other floating-leaved and floating species include *Nuphar advena* (Yellow water-lily), *Spirodela polyrhiza* (Giant duckweed), and two species of floating liverworts, *Riccia fluitans* (Slender riccia) and *Ricciocarpus natans* (Purple-fringed riccia). *Nuphar advena* occurred at the entrance to the backwater channel in the southeast corner of the south basin. The floating liverworts were found in the south basin and the backwaters of the swamp forest, and represented the first reported occurrence of these species in the estuary. The increased appearance of Ricciaceae may be related to seasonal flooding or high rainfall.

SUBMERGED MACROPHYTES

Seven species of submerged macrophytes were found in open water areas of the estuary (Table 2). Only *Ceratophyllum demersum* and *Potamogeton pectinatus* have established populations, and only *C. demersum* occurred south of Star Island. This free-floating plant, found throughout the estuary, formed dense monotypic beds in quiet shallow areas along the shoreline, particularly in the northwest embayment of the main basin and throughout the backwater channel extending into the swamp forest. *Ceratophyllum demersum* was also frequently found scattered throughout the dense beds of *Nelumbo lutea.* Away from the shore and into the open water of the northwest embayment, *C. demersum* was replaced by scattered patches of *P. pectinatus. Potamogeton pectinatus* was also present in the nearshore of the north basin. A few scattered patches of *P. pectinatus, P. foliosus* (Leafy pondweed), and *Myriophyllum spicatum* were discovered immediately north of Star Island on the perimeter of the *N. lutea* beds and along the main channel of the creek in 1995.

An isolated population of *Myriophyllum spicatum,* believed to be the first documented occurrence within the estuary, was discovered in 1992 but failed to reappear in 1993 or 1994 (Whyte & Francko 2002). A second population was discovered north of State Route 6 in 1993, but also failed to return in 1994. Numerous fragments of this species were found floating in the northwest embayment and north of State Route 6 in 1993 and 1994. In 1995, multiple sites within

TABLE 2. Species of aquatic plants observed (X) in areas of open water in the Old Woman Creek estuary from 1993 through 1997.

Species	1993	1994	1995	1996	1997
Submersed					
Ceratophyllum demersum	X	X	X	X	X
Elodea canadensis			X		
Myriophyllum spicatum	X	F*	X	X	
Potamogeton crispus	X		X		
Potamogeton foliosus		X			
Potamogeton nodosus		X			
Potamogeton pectinatus	X	X	X	X	X
Floating-Leaved					
Nelumbo lutea	X	X	X	X	X
Nuphar advena	X	X	X	X	X
Nymphaea tuberosa	X	X	X	X	X
Floating					
Lemna minor	X	X	X	X	X
Riccia fluitans		X	X		
Ricciocarpus natans	X	X			
Spirodella polyrhiza	X	X	X	X	X
Total	10	10	12	8	7

F* Floating fragments observed

the northwest embayment and just north of State Route 6 were found containing several rooted plants. Although growing within the vicinity of the sampled transect lines, *M. spicatum* was not found in any of the sample plots.

Species diversity and frequency of occurrence were highly variable from 1993 to 1997 (Table 3). *Potamogeton pectinatus,* the dominant submersed macrophyte in 1993, all but disappeared in 1994, although a few scattered patches were found. It reappeared in 1995, although was less abundant than in 1993. All submersed aquatic plant species were relatively scarce in 1994. Macrophytes were recorded in only 17 percent of the sampled quadrats. In 1995, submerged plants were more abundant and the submerged aquatic community was slightly more diverse. *Potamogeton foliosus* and *Elodea canadensis,* species previously unreported in the estuary, and *P. nodosus* (Longleaf pondweed) and *P. crispus* (Curlyleaf pondweed), species not reported in over 15 years, were found in the northwest embayment. The submersed macrophyte community had not previously been well studied, and therefore it is possible that these and other species may have been missed in previous surveys.

EMERGENT AQUATIC MACROPHYTES

Steep banks and occasional low-lying areas supporting a dense growth of woody riparian vegetation characterize the OWC shoreline. The common species *Quercus alba* (White oak), *Q. palustris* (Pin oak), *Salix exigua* (Sandbar

TABLE 3. Percent occurrence of aquatic plants found in all sample plots (in the Northwest Embayment) for the period 1993–1995, 1997.

Species	1993	1994	1995	1997
Ceratophyllum demersum	19.7	1.3	48.2	0
Potamogeton pectinatus	21.3	0	5	0
Lemna minor	23.8	NA	48.2	<1
Nelumbo lutea	23	8.9	2.1	2.7
Nymphaea tuberosa	3.3	4.5	2.1	1.8
Polygonum amphibium	<1	1.3	<1	0
Typha glauca	<1	0	0	0
Sagittaria latifolia	1.6	1.3	2.1	0
Spirodella polyrhiza	1.6	NA	0	<1
Phragmites australis	1.6	1.3	1.4	2.7
Phalaris arundinacea	<1	0	0	0
Sparganium eurycarpum	<1	<1	<1	0
Potamogeton foliosus	0	0	<1	0
Leersia orzyoides	0	0	<1	0
Total Species Present	12	7	11	5
Present/Absent (Total %)	68/54 (55.7)	27/130 (17.2)	100/41 (70.9)	10/98 (9.3)

willow), *Cornus florida* (Flowering dogwood), *C. drummondii* (Rough-leaved dogwood), *Cephalanthus occidentalis, Populus deltoides* (Cottonwood), and *Vitis riparia* (River-bank grape) formed a closed canopy, limiting available light to understory and shoreline emergent vegetation. The combination of a closed canopy and steep bluffs reduced available habitat for the growth of emergent vegetation. Common species characteristic of this environment were *Impatiens capensis* (Jewel-weed), *Iris versicolor* (Blue-flag), *Leersia orzyoides* (Rice cut-grass), *Phalaris arundinacea* (Reed canary-grass), *Pilea pumila* (Clearweed), *Lobelia inflata* (Indian tobacco), *Ranunculus hispidus, Scutellaria lateriflora* (Skullcap), *Solanum nigrum* (Black nightshade), and *Carex* spp. Adjacent to the shoreline and extending into the open water, fallen trees and discarded railroad ties formed a micro-habitat providing a suitable substrate for a number of weedy herbaceous species (e.g., *Setaria faberi* (Foxtail-grass), *Carex comosa, Eclipta prostrata* (Yerba-de-tajo), *Polygonum persicaria* (Lady's thumb), and *Rorippa palustris* (Common yellow-cress).

Along certain reaches of shore, steep bluffs give way to open areas of low relief. These shoreline floodplain areas were seasonally inundated and supported extensive monotypic colonies of *Phragmites australis.* Few species are associated with *P. australis,* although *Echinocystis lobata* (Wild cucumber) a climbing annual vine, grows extensively over much of the *P. australis. Phragmites australis* is a recent invader, having first appeared in OWC in the mid-1980s. *Sparganium eurycarpum, Scirpus fluviatilis, Sagittaria latifolia,* and *Polygonum amphibium* represented the dominant vegetation of the shallow nearshore waters. These emergent species form the transition from the *Phragmites*-dominated shoreline to open water. Typically found growing in monotypic stands within OWC, they occasionally grew in association with each other. A large monotypic stand of *Scirpus fluviatilis* occupied an area of permanent shallow water, sepa-

rating the river channel from the quiet waters of the south basin. A zone of *Sparganium eurycarpum* bordered the *Scirpus fluviatilis* stand and extended almost the entire length of shoreline behind the railway and into the backwaters of the swamp forest. Species unique to the channel include *Nuphar advena* and *Scirpus validus* (Softstem bulrush). Additional areas of shore were either seasonally flooded or wet but free of standing water, and supported a diversity of herbaceous species. The more common species included *Hibiscus moscheutos* (Rose-mallow), *Scirpus atrovirens* (Green bulrush), *Impatiens capensis, Polygonum hydropiperoides* (Water-pepper), *Asclepias incarnata* (Swamp-milkweed), *Lycopus americanus* (American water-horehound), *L. europeaus* (European water-horehound), *Scutellaria lateriflora, Iris versicolor, Phalaris arundinacea, Rumex verticillatus* (Swamp dock), and *Eupatorium perfoliatum* (Boneset). In addition, species of *Carex, Scirpus, Cyperus, Juncus* and various graminoids were scattered throughout these areas.

Shoreline and littoral vegetation varied from year to year, depending upon water levels. In 1995, exposed mudflats were characterized by dense stands of *Leersia orzyoides* and *Lindernia dubia* (False pimpernel). *Bidens cernua* (Burmarigold) and *Echinochloa walteri* were also widespread along the exposed shoreline. Prior to 1995, estuary water levels were sufficiently high to limit the growth of *Leersia orzyoides* and other mudflat species to occasional patches along the shoreline. High waters may also have restricted the growth of several species common to many Lake Erie wetlands but rare or only locally common in OWC, including *Pontederia cordata* (Pickerelweed), *Peltandra virginica* (Arrow arum), *Acorus americanus* (Sweet flag), *Typha latifolia* (Broad-leaf cattail), and *Nuphar advena. Pontederia cordata* had not been observed in OWC since the early 1980s (Gene Wright, pers. comm.). Several plants were growing along the shoreline in the northwest embayment in 1995, apparently the result of exposed sediment allowing seed germination. In 1996 and 1997 the number of plants found scattered along the shoreline continued to increase. *Acorus americanus* was locally common in a small embayment immediately southwest of Star Island. *Typha latifolia* was generally limited to a single small stand in the northwest embayment. *Peltandra virginica* was restricted to a few scattered plants in the shallow embayments.

SAND BARRIER-BEACH VEGETATION

The barrier-beach is small. West of the mouth, the beach extends approximately 240 m and is about 15 m wide. East of the mouth, the beach extends an additional 210 m and is about 60 meters wide. The exposed beachfront (facing Lake Erie) was relatively vegetation-free, owing to continual wave action reshaping the beachfront. Along protected areas of moist shoreline the dominant vegetation consisted of *Bidens cernuua, Cyperus odoratus, Pilea pumila,* and several species of *Polygonum. Populus deltoides* seedlings were scattered about the beach, particularly along the west bank of the mouth. *Cakile edentula* (Sea rocket), *Salsola kali* (Saltwort), *Xanthium strumarium* (Cocklebur), *Euphorbia polygonifolia* (Seaside-spurge), *Strophostyles helvola* (Wooly bean), *Polygonum*

pensylvanicum (Pennsylvania smartweed), *Oenothera biennis* (Evening primrose), *Equisetum arvense* (Common horsetail), and *Salix exigua* were found scattered on the upland portions of the beach. *Phragmites australis* formed large monotypic stands along the west and east banks, and extended the length of the backshore, fronting the north basin. *Triplasis purpurea* (Purple sand-grass) and *Panicum virgatum* (Switchgrass) were common on open upland areas. Other species present, but rare or locally scattered, were *Scirpus americanus* (American bulrush), *S. fluviatilis, Impatiens capensis, Scutellaria lateriflora,* and *Lycopus americanus. Rhus typhina* (Staghorn sumac) and *Vitis riparia* extended the length of the west beach representing the area of transition from the bordering woodland to the open sand.

PLANT COMMUNITY PEAK BIOMASS

Peak biomass results show distinct differences between community types (Table 4). Emergent plants such as *Phragmites australis* and *Scirpus fluviatilis* produce considerably greater above-ground biomass than either floating-leaf or submersed plants. During periods when the estuary is flooded and few exposed areas are available for emergent growth, these emergents are limited in their areal extent and their peak biomass becomes relatively unimportant when considering total system production (Reeder, 1990). *Nelumbo lutea,* which is the dominant wetland plant in the estuary, had a considerably lower peak biomass than either *Phragmites australis* or *Scirpus fluviatilis.* The reported peak biomass value for *Nelumbo lutea* is much lower than typical values reported for *N. lutea* and other floating-leaf plants (Robb 1989; Reeder 1990; Whyte 1996), and may be an indication of a senescing bed. In each year of the study period, *N. lutea* was observed to decline in areal extent in the northwest embayment. *Ceratophyllum demersum* peak biomass in the nearshore waters of the northwest

TABLE 4. Peak above-ground biomass of selected stands of aquatic and wetland vegetation in the OWC wetland, August 1995.

Community Type	Biomass (above-ground, g/m^2)	Location
Submerged		
Ceratophyllum demersum		
nearshore	96	NW embayment
open water	31.6	NW embayment
Potamogeton pectinatus	2.5	NW embayment
Emergent		
Phragmites australis	1339.2	NW embayment
Nelumbo lutea	141.6	NW embayment
Scirpus fluviatilis	2498.1	South Basin

embayment was only slightly lower than that of *N. lutea,* and increased its area of colonization each year of the study.

Prior to the expansion of macrophytes throughout the wetland, Klarer and Millie (1992) indicated OWC to be an algal-based system. Reeder (1990) reported that *N. lutea* beds accounted for only about 1/10 as much annual carbon fixation as open water planktonic communities. Our data, however, indicate an increasing areal extent of *N. lutea.* In assessing the relative importance of macrophytes in terms of peak-season carbon assimilation and peak-season productivity in OWC, Francko and Whyte (1999) suggest macrophytes play a more important role than phytoplankton. Francko and Whyte (1999) estimated *N. lutea* peak productivity vales were 1200 g biomass m^{-2} yr^{-1}, and about 400 g biomass m^{-2} yr^{-1} for macrophytes on an estuary wide basis, and account for more than twice that of the planktonic open water communities. OWC with increasing macrophyte production has switched from a grazer-based system to detrital-based. One of the reasons for this change to a detrital-based system is that the wetland system studies by Klarer and Millie (1992) and Reeder and Mitsch (1989) occurred during a period when *N. lutea* coverage was approximately half of that during the current study.

A continuing shift in the OWC estuary from a phytoplankton dominated system to an open-water system dominated by *N. lutea,* to an emergent community dominated by plants such as *Sagittaria latifolia, Typha* spp., *Phragmites australis,* and *Peltandra virginica* will undoubtedly further increase OWC productivity. *Phragmites australis* above-ground biomass values in OWC average about 1500 g/m^2. Extended periods of low water will likely allow the continued expansion of this aggressive wetland plant. Whigham and Simpson (1992) report peak biomass values in several New Jersey coastal marshes for *Peltandra virginica* and *Sagittaria latifolia* to be as high as 750 g/m^2 and 140 g/m^2, respectively. In Dupont marsh, a Lake Erie coastal wetland located on the Huron River and within a few miles of OWC, *Peltandra virginica* peak biomass was approximately 70g/m^2 (unreported data, Robert Whyte). Dupont Marsh may provide an example of what OWC looked like during low water periods.

FACTORS AFFECTING VEGETATION DYNAMICS

There are a number of physical and biological factors likely affecting the aquatic vegetation in OWC. Great Lakes coastal wetlands are dynamic systems exhibiting a direct relationship between water level fluctuations on the Great Lakes and the physico-chemical and biotic environment of the wetland. Water depth and underwater light attenuation may have been the most important abiotic regulator of submerged plants in OWC for the study period reported (Whyte & Francko 1997). The mean water depth in the northwest embayment was approximately 18 cm lower in 1995 than 1994; yet mean turbidity was unchanged between years. Greater submerged plant growth reported here and elsewhere (Francko & Whyte 1999, Whyte et al. 1997, and Whyte 1996) indicating greater overall macrophyte production in 1995 suggest that the lower mean water depth

in 1995 permitted increased light penetration and complete extension of the 1% compensation depth through the water column. A comprehensive review of the physical and environmental factors regulating plant growth in OWC such as water level fluctuations are discussed in Whyte (1996).

The role of biotic factors in influencing community structure should also be considered. Rather than being driven solely by fluctuations in water levels and other physical disturbances, macrophyte community dynamics in OWC may be influenced by inter- and intraspecific competition. For example, evidence suggests that dense *Nelumbo lutea* beds of floating and aerial leaves effectively diminish the amount of photosynthetically active radiation (PAR) available to existing submersed macrophytes, as well as some nearshore emergent plants (Whyte 1996). This suggests that the disappearance of *Peltandra virginica* from the embayments in the 1970s, and the present decline in *Potamogeton pectinatus* is a function of light limitation occurring from a combination of turbidity and *N. lutea* shading, as well as increased water depths.

Competitive displacement of existing vegetation may also be occurring through the invasion of non-native species throughout the Great Lakes region. Many of these non-indigeneous species form large monotypic stands that eliminate native vegetation. Of principal concern to the emergent community is *Lythrum salicaria* (Purple loosestrife), and in the open water, *Myriophyllum spicatum. Lythrum salicaria* first appeared in OWC sometime in the early 1980s, but an active management program has limited its spread in the estuary. *Phragmites australis,* a tall native perennial grass and recent invader, has formed large colonies on the barrier-beach, along the shoreline, and in areas of shallow water. Continued expansion threatens the few sedge and wet meadow communities within the estuary. *Phragmites australis* first appeared in the estuary along the backside of the barrier beach in the mid-1980s, and has since spread to all open areas along the shore. Although Stuckey (1989) documents *Myriophyllum spicatum* in western and central Lake Erie, a literature survey and review of specimen sheets from herbaria at Miami University, Ohio State University and Kent State University provide strong evidence that the present study represents the first documented occurrence of this species in OWC. The fact that *Myriophyllum spicatum* has been observed only north of Star Island suggests that pioneer populations probably invaded from Lake Erie during periods when the barrier beach was open. Perhaps the best explanation for limited expansion of *M. spicatum* in OWC is the periodic drawdown of water and freezing of the surficial sediment during the winter (Whyte and Francko 2002).

LONG TERM VEGETATION CHANGE

General patterns of change in plant communities since 1974 are most noticeable in the embayment marshes. The diverse embayment marsh communities reported by Marshall (1977) have been replaced by large monotypic stands of *Phragmites australis.* Disturbances such as increased sedimentation, nutrient enrichment, and fluctuating water levels favor the invasion and spread of *P. aus-*

tralis (Marks et al. 1994). Stuckey (1989) reports *P. australis* to be common in the western basin; however, this plant was considered rare in northeastern Ohio prior to the 1980s (Bissell 1982) and there is little mention in the literature of the presence of *P. australis* in the western basin. Pieters (1901) and Jennings (1908) however, both reported the presence of *P. australis* in Sandusky Bay at the turn of the twentieth century. The aggressive appearance of *P. australis* in OWC and elsewhere throughout the western basin appears to coincide with the high water conditions of the 1980s. In OWC and other coastal wetlands, *P. australis* first appeared on the beachfronts and gradually spread inland.

The disappearance of *Peltandra virginica* and expansion of *Nelumbo lutea* have coincided with elevated water levels in Lake Erie. Since 1973 water levels have generally been above the long-term mean, with record high levels in 1973 and 1986. Increased water depth and a concomitant decrease in light availability with depth appear to be important factors in limiting the growth of *P. virginica.* Whigham et al. (1979) suggested that successful establishment of *P. virginica* does not occur at depths greater than 0.5 m, a condition periodically found in OWC. The extremely turbid nature of the estuary's waters may inhibit the germination of *P. virginica* seeds at depths less than 0.5 m. A combination of rising water levels and increased *Nelumbo lutea* cover would also effectively diminish available light to germinating *P. virginica* seeds. Sediment cores collected in conjunction with this study found a large number of ungerminated and nonviable *P. virginica* seeds in existing *N. lutea* beds, an indication of the estuary's once extensive *P. virginica* beds (unpublished data, Robert Whyte). Additional factors contributing to the disappearance of *P. virginica* may include fish predation on seeds, scouring of sediment, and allelopathy from *N. lutea* and *Nymphaea tuberosa* (Vance & Francko 1997).

SUMMARY

The diversity and abundance of aquatic and wetland vegetation in OWC observed for the 1993 through 1997 growing seasons varied both seasonally and annually. Survey data showed an estuary dominated by perennial beds of the floating-leaved *Nelumbo lutea,* and locally extensive beds of the submersed species *Potamogeton pectinatus* and *Ceratophyllum demersum.* A pioneer population of *Myriophyllum spicatum* was documented in 1992 and had expanded slightly by 1995. The number of aquatic and wetland plant species is greater than previously documented, and is similar to other wetlands of southern Lake Erie.

OWC is an extremely dynamic system affecting the species composition, abundance, and species-specific biomass of the plant communities. Natural disturbances are driven by water level fluctuations controlled by the sand barrier-beach and lake levels. Existing plant communities appear to be the result of a prolonged period of water levels above the long-term mean that existed through the early 1990's. The flooded basin has been favorable to the growth of *Nelumbo lutea,* but has restricted emergent plant growth to the immediate shoreline. A variety of wetland habitats enhance plant species diversity within OWC. The low diversity within each of the respective plant communities suggests that disturbance (i.e.,

water level fluctuations, biotic interactions, wave and wind activity, and watershed activity) may be a significant regulator of plant community structure.

The lack of recent inventories of the aquatic and wetland plants occurring in the wetlands along the south shore of Lake Erie makes any analysis of vegetation response to environmental factors difficult. Krieger et al. (1990) summarized a priority research agenda for Great Lakes wetlands which included an immediate need to document major floral species involved in community dynamics, and the characterization of the present dynamics of wetland vegetation and the potential importance of invasive plant species in future dynamics. Klarer and Millie (1992) emphasized the need for increased focus on the long-term effects of environmental factors such as fluctuating water levels. It is also unclear if coastal wetland systems respond similarly to environmental variables and how physical, chemical and biological characteristics of each system effect plant community response. The classification of coastal wetlands (e.g., based on dominant vegetation or complete flora) would allow the discrete grouping of wetlands, and facilitate analyses of various factors in regulating plant community structure. Higher priority must be given to the inventorying of Lake Erie's coastal wetlands, as well as further study of the interrelationships between biotic and abiotic components of the land, air, and water (Hartig and Vallentyne 1989). Such an approach may best help us define the interrelationships that exist between biotic and abiotic elements that comprise the Great Lakes coastal wetland environment (Hartig 1995).

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NEW COUNTY RECORDS FOR PLANTS OF THE CHICAGO REGION

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The region surrounding Chicago, Illinois, is one of the most heavily urbanized in the nation, and at the same time one of the most fascinating botanically. Within a 75 mile radius of the downtown "Loop," an area encompassing 22 counties in four states and about 11,000 square miles, may be found plant communities representative of the eastern deciduous forest, boreal conifer forest, and tall-grass prairie, as well as numerous disjunct elements from the Atlantic Coastal Plain. Over 1600 species and varieties are native to this region, and another 900 are naturalized.

The most recent summation of the flora of the Chicago region (as defined above) is provided by Swink and Wilhelm (1994). This compendium provides a wealth of empirical information on the ecology and biogeography of the plants of the region, including a county-level distribution map for each taxon recognized.

During a nine year residence in suburban Chicago (1990–1999), I collected a number of plant specimens in counties from which the respective species had not been reported by Swink and Wilhelm (1994). With my departure from the region, it seems appropriate to publish these county records, with an eye toward their inclusion in future editions of the book. For consistency and convenience, all nomenclature used herein follows that used by Swink and Wilhelm (1994). In cases where it seems useful, I have emulated their practice of listing associated species found in the same habitat with the species of interest.

Alopecurus geniculatus L. (Poaceae) Marsh Foxtail

ILLINOIS. Will Co.: Bolingbrook, Indian Boundary Park, north of Boughton Rd. and east of Naperville Rd., abundant in wet ditch on floodplain of East Branch DuPage River, between the two westernmost youth baseball diamonds, 4 Jun 1995, *T. G. Lammers 9371* (F, ISC, MU, OSH).

This European grass was first collected in the region in 1970, and has been reported from only DuPage and McHenry Counties, Illinois; and Kenosha Co., Wisconsin. At the site reported here, it was the dominant grass, filling a ditch 2 m wide and over 30 m long, to the near exclusion of all else.

Aster prealtus Poir. (Asteraceae) Willow Aster

ILLINOIS. Will Co.: Jackson Twp., along railroad tracks parallelling State Hwy 53 (old US Hwy 66), just north of its junction with Hoff Rd., 0.8 mi. S of Elwood, scattered in mesic prairie, 9 Oct 1994, *T. G. Lammers 9289* (F, TEX).

A somewhat frequent species in the region, reported from low meadows, thickets, and fens in nearly all counties. Associated species at the Will County site included *Andropogon gerardii* Vitman, *Aster ericoides* L., *A. laevis* L., *A. novae-angliae* L., *A. pilosus* Willd., *Coreopsis tripteris* L., *Eupatorium altissimum* L., *Lespedeza capitata* Michx., *Parthenium integrifolium* L., *Physostegia virginiana* (L.) Benth. var. *arenaria* Shimek, *Pycnanthemum virginianum* (L.) T. Durand & B. D. Jacks., *Ratibida pinnata* (Vent.) Barnh., *Solidago rigida* L., *Sorghastrum nutans* (L.) Nash, and *Spartina pectinata* Link.

Carex muskingumensis Schwein. (Cyperaceae) Swamp Oval Sedge

WISCONSIN. Racine Co.: Caledonia Twp. T4N R22E S3, along small creek flowing into Root River from the north, east of the railroad tracks and north of 7½ Mile Rd., just south of the Milwaukee Co. line, muddy riparian forest, 27 Aug 1999, *T. G. Lammers & N. A. Harriman 10804* (MU, OSH).

This sedge is not infrequent in the region, occurring in woods near major streams and in wooded depressions among glacial moraines. At the site reported here, associated species in the herbaceous layer included *Acalypha rhomboidea* Raf., *Carex grayii* Carey, *Laportea canadensis* (L.) Wedd., *Leersia virginica* Willd., *Mimulus ringens* L., *Penthorum sedoides* L., *Physostegia virginiana* (L.) Benth. var. *virginiana,* and *Rudbeckia laciniata* L.

Cuscuta campestris Yuncker (Convolvulaceae) Field Dodder

ILLINOIS. Will Co.: Bolingbrook, along Schmidt Rd. at the Lily Cache Creek culvert, parasitic on *Convolvulus arvensis* L. on weedy roadside, 31 Jul 1993, *T. G. Lammers 8869* (F, ILL, MU).

This holoparasite occurs occasionally in the region in disturbed sites; introduced *Convolvulus arvensis* is the most frequent host plant. Reported from only Cook, DuPage, Grundy, Kankakee, and Lake Counties, Illinois; and Porter County, Indiana.

Duchesnea indica (Andrews) Focke (Rosaceae) Indian Strawberry

ILLINOIS. Will Co.: Bolingbrook, along S bank of Lily Cache Creek, just E of the Schmidt Rd. culvert, weedy disturbed floodplain woods, 2 May 1998, *T. G. Lammers 10625* (BRIT, F, MU, OSH).

An Asian species, naturalized in disturbed often shaded sites in several counties in the region. Swink and Wilhelm (1994) comment that it is "slowly but surely becoming more frequent in the Chicago region."

Elymus riparius Wieg. (Poaceae) Riverbank Wild Rye

ILLINOIS: Cook Co.: Palos Twp., Swallow Cliffs Woods Forest Preserve, SW of the junction of US Hwy 45 and State Hwy 83, low open area at head of ravine NW of parking lot, 26 Sep 1997, *T. G. Lammers 10435* (F, ISC).

A frequent but perhaps undercollected species, occurring in calcareous woodlands, espcially along bluffs of streams and rivers. Associated species in the herbaceous layer at the Cook Co. site included *Bidens frondosa* L., *Boehmeria cylindrica* (L.) Sw., *Glyceria striata* (Lam.) A. S. Hitchc., *Leersia virginica* Willd., *Muhlenbergia frondosa* (Poir.) Fern., *Pilea pumila* (L.) A. Gray, *Poly-*

gonum cespitosum Blume var. *longisetum* (Bruyn) Stewart, *P. punctatum* Ell., *P. virginianum* L., and *Scrophularia marilandica* L.

Euphorbia serpens HBK (Euphorbiaceae) Round-leaved Spurge

ILLINOIS. Will Co.: Channahon Twp. T34N R9E S26 W½, ponds southeast of the junction of Drummond Rd. and West Patrol Rd., east of the railroad tracks, 3½ miles west of Elwood, in the Midewin National Grassland (formerly the Joliet Army Ammunition Plant), bare mud on drying pond bottom, 10 Sep 1997, *T. G. Lammers 10370* (F, MU, NY).

This report is not strictly speaking a county record. However, this species was reported from the region solely on the basis of an unvouchered 1964 observation by Floyd Swink. Swink's locality was either at or very near the site from which the present voucher was obtained. Associated species included *Amaranthus tuberculatus* (Moq.) Sauer, *Bidens comosa* (A. Gray) Wieg., *Conobea multifida* (Michx.) Benth., *Cyperus acuminatus* Torr. & Hook., *Eleocharis acicularis* (L.) Roem. & Schult., *Helenium autumnale* L., *Lippia lanceolata* Michx., *Ludwigia palustris* (L.) Ell. var. *americana* (DC.) Fern. & Grisc., *L. polycarpa* Short & R. Peter, *Lycopus asper* Greene, *Penthorumn sedoides* L., *Polygonum hydropiper* L., *P. hydropiperoides* Michx., *P. lapathifolium* L., *P. pensylvanicum* L., and *Scutellaria lateriflora* L.

Lonicera morrowii A. Gray (Caprifoliaceae) Morrow's Honeysuckle

ILLINOIS: Will Co.: Jackson Twp., along railroad tracks parallelling State Hwy 53 (old US Hwy 66), just north of its junction with Hoff Rd., 0.8 mi. S of Elwood, degraded mesic prairie, 21 May 1995, *T. G. Lammers 9333* (F, MU, NA, OSH); Bolingbrook, along S bank of Lily Cache Creek, just E of the Schmidt Rd. culvert, weedy disturbed streambanks, 28 Apr 1998, *T. G. Lammers 10622* (BRIT, F, NA). Grundy Co.: Braceville Twp., along State Hwy 53 (old US Hwy 66), 5.6 mi. SW of its junction in Braidwood with State Hwy 113, just SW of the bridge over Mazon River, common on margin of deciduous woods, 31 May 1997, *T. G. Lammers & A. M. Mahoney 9898* (F, NA).

Though this cultivated Asian species is widely nauralized in North America, in the Chicago region it has been reported from only Cook, Lake, and McHenry Counties, Illinois; and Walworth County, Wisconsin.

Malus prunifolia (Willd.) Borkh. (Rosaceae) Plum-leaved Crab

ILLINOIS. Will Co.: Bolingbrook, along S bank of Lily Cache Creek, just E of the Schmidt Rd. culvert, weedy disturbed floodplain field, 2 May 1998, *T. G. Lammers 10626* (BRIT, F, MU, NA).

This cultivated Asian species was first collected in the region as a naturalized plant in 1987. It has been reported only from DuPage and Kane Counties, Illinois.

Malva alcea L. (Malvaceae) Vervain Mallow

ILLINOIS. Will Co.: Bolingbrook, along Lily Cache Creek, south of Cumberland Dr., brushy thickets, 1 Jul 1995, *T. G. Lammers 9480* (F, MU).

This European species has been collected as a naturalized plant in the region only once previously, in Kane County in 1989.

Myriophyllum spicatum L. (Haloragidaceae) European Water Milfoil

ILLINOIS. Will Co.: Bolingbrook, pond (excavated no more than 3 yrs earlier) just SE of the intersection of Weber Rd. and Lily Cache Lane, abundant in shallow water, 27 Sep 1997, *T. G. Lammers 10453* (F).

This naturalized Europe species was first collected in the region in 1970. Since that time, it has become all too common in ponds and lakes, both artificial and natural.

Panicum columbianum Scribn. (Poaceae) Hemlock Panic Grass

ILLINOIS. Will Co.: Custer Twp., along State Hwy 53 (old US Hwy 66), 2.6 mi. S of the bridge over the Kankakee River in Wilmington, sandy ditch, 17 Jun 1993, *T. G. Lammers 8750* (F, ILLS, ISC, MU, MWI).

Frequent in sandy soil and dunes of the eastern portion of the region but much more scarce in the western portion. Associated species at the Will County site included *Allium canadense* L., *Phlox glaberrima* L. var. *interior* Wherry, and *Oenothera pilosella* Raf.

Polygonum aviculare L. (Polygonaceae) Common Knotweed

ILLINOIS. Will Co.: Bolingbrook, 520 Princeton Dr., in bluegrass lawn, 19 Sep 1997, *T. G. Lammers 10385* (F, MU).

An infrequent weed of disturbed ground, native to Europe, and known in the region from only Cook, DuPage, and Kane Counties, Illinois; and Jasper, Porter, and Starke Counties, Indiana.

Salix fragilis L. (Salicaceae) Crack Willow

ILLINOIS. Will Co.: Bolingbrook, along S bank of Lily Cache Creek, just E of the Schmidt Rd. culvert, weedy disturbed streambanks, 28 Apr 1998, *T. G. Lammers 10620* (BRIT, F, MU, NA).

A native of Eurasia, not infrequently escaped from cultivation in the region.

Samolus parviflorus Raf. (Primulaceae) Water Pimpernel

WISCONSIN. Racine Co.: Caledonia Twp. T4N R22E S3, along small creek flowing into Root River from the north, east of the railroad tracks and north of 7½ Mile Rd., just south of the Milwaukee Co. line, infrequent on bare mud in riparian forest, 27 Aug 1999, *T. G. Lammers & N. A. Harriman 10791* (MU, OSH, WU).

Rare in the region, occurring on muddy floodplains and in shaded ditches at scattered localities. For a list of associated species at this site, see *Carex muskingumensis* above. This species, treated as *Samolus valerandi* L. subsp. *parviflorus* (Raf.) Hultén, is shown at www.botany.wisc.edu as occurring in Wisconsin only in Milwaukee County.

Silphium integrifolium Michx. × *S. terebinthinaceum Jacq.*
(Asteraceae)

ILLINOIS. Will Co.: along Joliet Rd. (old US Hwy 66), opposite entrance to Traders Corner Picnic Area of Veterans Woods Forest Preserve, 0.4 mi. NE of its junction with State Hwy 53, single plant in roadside thicket, 18 Aug 1990, *T. G. Lammers 7428* (F, TEX).

Though both parental species are common in prairies of the region, this is the first report of their hybrid. *Silphium integrifolium* was quite common at the site, while *S. terebinthinaceum* was represented by just a single multi-stemmed clump. Near the latter was a similar clump of the putative hybrid. This hypothesis of hybridity was based upon morophological intermediacy. For example, the suspected hybrid had sparsely leafy stems averaging 1.5 m tall, which are clearly intermediate between the more densely leafy stems of *S. integrifolium,* which averaged 1.4 m tall, and the scapose stems of *S. terebinthinaceum,* which averaged 2.5 m tall. Similarly, the alleged hybrid had winged petioles with a pair of large stipule-like flanges at base; these seem a compromise between the sessile clasping leaves of *S. integrifolium* and the petiolate leaves of *S. terebinthinaceum.*

Associated with the hybrid and its parents in the thicket were *Asclepias syriaca* L., *Aster ericoides* L., *A. novae-angliae* L., *Cirsium altissimum* (L.) Spreng., *Cornus racemosa* Lam., *Eupatorium rugosum* Houtt., *E. serotinum* Michx., *Helianthus grosseserratus* M. Martens, *Oenothera biennis* L., *Parthenocissus quibquefolius* (L.) Planch., *Rosa carolina* L., *Solidago canadensis* L., *Vitis riparia* Michx.

Viburnum lantana L. (Caprifoliaceae) Wayfaring Tree

ILLINOIS. Will Co.: Bolingbrook, along S bank of Lily Cache Creek, just E of the Schmidt Rd. culvert, weedy disturbed floodplain field, 2 May 1998, *T. G. Lammers 10627* (BRIT, F, MU, NA).

Native of Eurasia, frequently naturalized in the region.

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NOTEWORTHY COLLECTIONS:

MINNESOTA AND WISCONSIN

Veronica prostrata L. (Scrophulariaceae). Prostrate Speedwell.

Previous knowledge. Veronica prostrata is a herbaceous perennial native to most of Europe (Tutin et al. 1972). It has procumbent vegetative stems that bear congested racemes ascending from the axils, showy enough that the species is cultivated for ornament. *Veronica prostrata* has long been grown in North America, but seems not to have been reported as an escape from gardens.

Significance. Collections were made from a lawn in Minnesota, apparently the first report of escape for North America; no cultivation of the species was evident in this vicinity and all plants were at least 1 m from the edge of the turf. Some plants had deep blue corollas and others had pale blue corollas; both of the phenotypes were restricted to the same area, of less than 1 m^2, so long-term persistence of the species in this location seems tenuous. The plants reported here later had the erect stems mowed off before they matured fruits. These specimens from the lawn are shorter than specimens at MIN that were collected from the wild in Europe.

MINNESOTA. ST. LOUIS CO.: corollas pale blue, SW-facing bank of lawn of church building, 19th Ave. E above 4th St., Duluth, S-C Sec. 14, T50N R14W, 2 Jun 2001, *Schimpf 302* (DUL); same location and date, corollas deep blue and slightly smaller than those of *Schimpf 302, Schimpf 303* (DUL).

Verbascum chaixii Vill. (Scrophulariaceae). Nettle-leaved Mullein.

Previous knowledge. Verbascum chaixii is a herbaceous perennial native to much of Europe (Tutin et al. 1972). It is grown for ornament in North America, but seems not to have been reported as escaped from cultivation. Wild plants typically have yellow corollas (Cullen et al. 2000); some horticultural selections have white corollas (Everett 1982).

Significance. A collection from Minnesota appears to be the first report from outside of cultivation in North America. The plants grew in lawn margins in a residential neighborhood where there was neither evidence of current cultivation nor recollection by the residents of recent cultivation. Several plants believed to be this species bolted, but all except the one listed below were mowed off before flowering.

MINNESOTA. ST. LOUIS CO.: corollas white, filaments purple-hairy, first day in flower, lawn of 1100 block of Brainerd Ave., Duluth, NE ¼ Sec. 15, T50N R14W, 22 Jul 2001, *Schimpf 318* (DUL).

Camelina rumelica Velen. (Brassicaceae). Graceful False Flax.

Previous knowledge. Camelina rumelica is a winter annual native from the Balkans to Afghanistan (Davis et al. 1965). Its presence in North America, in grain fields and open habitats, went unrecognized for decades until the 1980s (McGregor 1984). It has been reported from Kansas, Oklahoma, Texas, Colorado, Nevada, and Oregon (USDA 2001). Its pale petals and lack of stellate hairs distinguish it from *Camelina microcarpa* Andrz. (Rollins 1993).

Significance. A collection from an active railyard in Duluth, Minnesota is apparently the first one for the northeastern floristic region. Individuals were scattered across and along many parallel tracks, which I read as a clue that that the seeds had arrived in several different shipments of grain. *Camelina microcarpa* had a similar local abundance, distribution and developmental stage at the time of collection, *Schimpf 245* (DUL). Most of the grain brought to this port is grown in the northern Great Plains, a fact that raises the likelihood that source populations of *C. rumelica* exist in states or provinces outside of the previously reported North American range for the species.

MINNESOTA. ST. LOUIS CO.: in flower and fruit, petals yellowish white with green veins, not common but widely scattered in ballast among rail tracks, Rice's Point, Duluth, Sec. 3, T49N R14W, 12 Jun 1995, *Schimpf 244* (DUL).

Geranium pratense L. (Geraniaceae). Meadow Cranesbill.

Previous knowledge. Geranium pratense is a rhizomatous herbaceous perennial native to Eurasia (Tutin et al. 1968), and is cultivated for ornament. Naturalization in a few northeastern states (USDA 2001) and adjacent Canada (Scoggan 1978) has been reported, with a disjunct range in southeastern Manitoba (Scoggan 1978). A single collection from lower Michigan is doubtfully an escape (Voss 1985). I am not aware of other collections from the upper Great Lakes region.

Significance. These collections near the western tip of Lake Superior are apparently the first for Minnesota and Wisconsin. The two Duluth populations were several km apart, neither was near a likely site of cultivation, and each appeared to be spreading locally. Both were associated with shrubs, tall grasses and forbs on well-drained ground. Plants close to pavement did not fruit because of occasional mowing. Plants in fruit were up to 75 to 100 cm tall. The population in Sec. 5 (my #*296*) began flowering almost 2 weeks later than the one in Sec. 13 (my #*285*). The plants in Superior were in a large industrial district, very far from any likely site of cultivation; their petals were of a lighter shade and their herbage was less fragrant (but still densely glandular) than the Duluth plants, and they grew in moist ground. These plants were mowed before they matured fruit.

MINNESOTA. ST. LOUIS CO.: seed dispersed, Fremont St. between Grand Ave. and railroad, extending 25 m NE along railroad, Duluth, NE ¼ SW ¼ Sec. 13, T49N R15W, 14 Aug 2000, *Schimpf 285* (DUL, MIN); about 50 plants in flower over a 200 m^2 area, petals deep blue, same location as *Schimpf 285,* 16 Jun 2001, *Schimpf 308* (DUL, MIN); seed dispersed, locally common just S of creek above Michigan St., Duluth, SW ¼ SE ¼ Sec. 5, T49N R14W,

23 Sept 2000, *Schimpf 296* (DUL); about 10 plants in flower, petals deep blue, same location as *Schimpf 296,* 1 Jul 2001, *Schimpf 310* (DUL, MIN).

WISCONSIN. DOUGLAS CO.: two plants, petals medium blue, in ditch on N side of Winter St. 150 m E of Susquehanna Ave., Superior, NE ¼ SE ¼ Sec. 16, T49N R14W, 2 Jul 2001, *Schimpf 312* (DUL, WIS).

Galium mollugo L. (Rubiaceae). White Bedstraw.

Previous knowledge. Galium mollugo is a stoloniferous herbaceous perennial native to Eurasia (Tutin et al. 1976). In eastern North America, *G. mollugo* is widely naturalized (Gleason & Cronquist 1991), in grassy or disturbed places (Voss 1996). The collection site closest to Minnesota is in Iron Co., Wisconsin (Wisconsin Vascular Plants & Lichens, 2001).

Significance. A population of *G. mollugo* was found in Duluth, Minnesota, apparently the first report of this species in the state. These plants were common among tall forbs and grasses, sometimes under light shade, in well-drained ground.

MINNESOTA. ST. LOUIS CO.: between Lakewalk and railroad from 25th to 26th Aves. E, Duluth, SE ¼ SW ¼ Sec. 13, T50N R14W, 19 July 2000, *Schimpf 284* (DUL, MIN).

Polygonum sachalinense F. Schmidt (Polygonaceae). Giant Knotweed.

Previous knowledge. Polygonum sachalinense is a giant rhizomatous herbaceous perennial native to northern Japan and islands north of there (Ohwi 1965). Many botanists, particularly those outside of North America, treat it in the genus *Fallopia* or *Reynoutria.* Plants have escaped from cultivation in most northeastern states, as well as California, Oregon, Washington, Idaho, Montana, and adjoining Canadian provinces (USDA 2001, Scoggan 1978). The species is often confused with the similar *P. cuspidatum* Sieb. & Zucc., and both have noxious weed status in California, Oregon, and Washington. The species is documented for La Crosse, Ashland (this the nearest site to Duluth), and Iron Counties, Wisconsin (Wisconsin Vascular Plants & Lichens 2001).

Significance. P. sachalinense has been found in Duluth, Minnesota, apparently the first collections for the state. There were several large colonies scattered over many km, which probably existed for quite some time but were overlooked on the assumption that they represented *P. cuspidatum,* previously known in the area.

MINNESOTA. ST. LOUIS CO.: over 3 m tall, stem diameter up to 4 cm, just below Skyline Parkway, Duluth, SW ¼ Sec. 6, T49N R14W, 27 Aug 2000, *Schimpf 289* (DUL, MIN); up to 2.5 m tall, stem diameter up to 3.5 cm, SW of intersection Gold St. & Bayview Ave., Duluth, SE ¼ SW ¼ Sec. 11, T50N R14W, 2 Sept 2000, *Schimpf 291* (DUL, MIN).

Draba verna L. (Brassicaceae). Spring Whitlow-grass.

Previous Knowledge. Draba verna is a diminutive winter annual native to Eurasia. It is widely naturalized in temperate North America, with the main gap in its known distribution being the central plains states (USDA 2001) and

provinces (Scoggan 1978). The species has been collected from Douglas County, extreme northwestern Wisconsin (Wisconsin Vascular Plants & Lichens 2001).

Significance. A collection in Duluth, Minnesota is apparently the first for the state. Although the plants were numerous, this population was extremely localized, so its continued existence is far from certain.

MINNESOTA. ST. LOUIS CO.: in flower and fruit, common in gravel parking space of one campsite, but not found elsewhere in the campground, SW ¼ SE ¼ Sec. 13, T49N R15W, 16 May 2001, *Schimpf 301* (DUL, MIN).

Astragalus cicer L. (Fabacaeae). Chickpea Milkvetch.

Previous Knowledge. Astragalus cicer is a rhizomatous herbaceous perennial native to Europe (Tutin et al. 1968). It is planted for forage on the western Great Plains and westward in North America, growing best on moist, coarse soils and occasionally escaping (Stubbendieck & Conard 1989, Scoggan 1978). Isely (1998) felt that its occurrence outside of cultivation was greatly underreported. In the Great Lakes region, it has been reported outside of cultivation from Ingham County in lower Michigan (Voss 1985) and Taylor County in north-central Wisconsin (Wisconsin Vascular Plants & Lichens 2001).

Significance. A. cicer was growing at a recently inactivated iron mine in northeastern Minnesota. This is apparently the first report for the state. I infer that the species was deliberately introduced for stabilizing the crushed waste rock, the surface of which has the texture of very coarse sand. The plants, robust and fruiting abundantly, were common flanking haul roads where they intersected the highway, but the species did not extend south along the highway.

MINNESOTA. ST. LOUIS CO.: in flower and fruit, level ground on both sides of roads at south edge of mine site along highway 666, N of Hoyt Lakes, SE ¼ SE ¼ Sec. 20, T59N R14W, 31 Jul 2001, *Schimpf 319* (DUL, MIN).

Salsola collina Pallas (Chenopodiacaeae). Slender Russian-thistle.

Previous Knowledge. Salsola collina is an annual, native from extreme southeastern Europe to central Asia (Mosyakin 1996). It can be distinguished from *S. tragus* L. by its dominant vertical main stem, denser infructescence with appressed imbricate bracts, and lack of prominent wings on the fruiting perianth (Mosyakin 1996). *S. collina* has been reported for all states that border Wisconsin (USDA 2001) and its occurrence in Wisconsin is not surprising.

Significance. S. collina was found along a rail siding at the W edge of Chippewa Falls, Wisconsin, apparently the first report for the state. Stiff dry fruiting plants were rooted in late September near pliable green flowering individuals, the bracts of which were somewhat less appressed. The species was highly localized along this stretch of railroad, in a year in which it was very difficult for me to find any *Salsola* in the region.

WISCONSIN. CHIPPEWA CO.: a few dozen plants in sand, between asphalt parking lot of business cooperative and rail siding, NE ¼ Sec. 12, T28N R9W, 23 Sept 2001, *Schimpf 321* (DUL, WIS).

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TWENTY-FIVE YEARS OF CHANGE IN A DRY-MESIC FOREST OF SOUTHEASTERN WISCONSIN

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ABSTRACT

This study assesses successional changes in a southern dry-mesic forest (Curtis 1971) at the Wehr Nature Center in Franklin, Wisconsin, after 25 years of static management. The site was historically maintained by periodic fire. I sampled using techniques that duplicated a 1976 study of the same area. I then calculated importance values as per Curtis (1971) for the 2001 data and compared the results to those from 1976. Among the trees and saplings, I found a decline of importance in oak species, while species of ash and maple increased. I observed a rise in the importance of black cherry within the sapling stratum. Most notably, I found a drastic change in the composition of the shrub layer. Common buckthorn, an invasive exotic, virtually dominates the shrub stratum in 2001 and displaces gray dogwood, which was prevalent in 1976. In the herb layer, I found a rise in importance of jack-in-the pulpit and two of the most common herb species in 1976, enchanter's nightshade and white avens, remained the most prevalent in 2001. Garlic mustard increased in occurrence from 1976 to 2001. I conjecture the majority of the changes are due to the cessation of fire in the community. If left undisturbed, the dominant overstory may well shift from oak to maple, and the understory community will continue to be dominated by invasive exotic species.

INTRODUCTION

In presettlement times, the northwestern part of Franklin, Milwaukee County, Wisconsin was dominated by oak forest (SEWRPC 1997). According to Abrams (1992), oak forests are midsuccessional communities developed and maintained by periodic fires. These fires open the canopy, allowing for oak recruitment. Studies cited by Abrams (1992) point toward the potential replacement of oaks by shade-tolerant species in the absence of fire. Laatsch and Anderson (2000) found the suppression of fire in unmanaged oak woodlands correlates with an increase in density and cover of invasive exotic species. Invasive exotics often outcompete natives, becoming the prevalent species.

This study assesses changes that have occurred after 25 years of static management in a southern dry-mesic forest at the Wehr Nature Center in Franklin, Wisconsin. Data were collected in 2001 following protocols from a 1976 study and the changes are described. The 1976 study is compared to the 2001 results and an explanation of the changes is hypothesized. Predictions made in the 1976 study are evaluated.

DESCRIPTION OF STUDY AREA

The study surveyed a woods, hereafter referred to as College Woods, in the northwest part of Wehr Nature Center in Franklin, Milwaukee County, Wisconsin. College Avenue bisects College Woods into north and south portions. These parts are located at SW ¼ SE ¼ Section 32, T6N, R21E and NW ¼ NE ¼ Section 5, T5N, R21E respectively.

Franklin's average growing season is 175 days. Lake Michigan heavily influences the climate: high temperatures average 28 °C in July and –4 °C in January, lows average 15.3 °C in July and –13.8 °C in January. Most of the precipitation falls in the growing season and normal annual precipitation is 78.44 cm and average snowfall is 103.1 cm (NOAA 2001).

Ownership of College Woods has undergone a number of changes over the past 155 years. According to property maps, College Woods was under private ownership until 1929 (Sheperd & Weiler 1988). In 1929 and 1930, Milwaukee County Park Commission acquired the land from August Powers and Hugo Koch who owned the north and south portions respectively (Park Land Acquisition Book, Milwaukee County Park Commission, undated). The Wehr Nature Center was established as a self-managed park unit in 1975. College Woods has remained under static management since that time.

The large, spreading lower branches of the oaks in College Woods suggests that these trees were open grown, a condition probably maintained by fire (Abrams 1992). The overstory is characterized by a high density of these large oaks. The construction of College Avenue in the 1920s caused a change in the hydrology of College Woods. A large area is seasonally inundated with ponded water, due to poor drainage.

METHODS

The survey used 20 nested plots to sample shrubs and herbs, 10 plots north and 10 south of College Avenue. As described by Nowak (1976), the shrub plots are 2.0 by 8.0 meter rectangles. The herb sampling plot was nested inside the northeast corner of the shrub plot and measured 0.4 by 2.5 m. Trees were sampled using point-quarter sampling (Brower & Zar 1984), with 10 points north and 10 south of College Avenue. To prevent overlap, the plots and points were located randomly along 3 striated north-south transects lines that evenly divided College Woods. All plots and points maintained a 12 pace buffer from the road or trails to reduce influence from edge effect.

Relative frequency, relative density and relative dominance were calculated for trees, saplings and shrubs, while only relative frequency and relative cover were calculated for herbs. All importance value (I.V.) calculations followed Curtis & McIntosh (1951) except the herbs, which follows Kershaw (1964), summing only relative frequency and cover.

RESULTS

A comparison of the 2001 to 1976 data shows a loss of oak importance in the past 25 years. This is consistent with Nowak's (1976) prediction that "oaks will decline in the future." In 1976, *Quercus rubra* (red oak) was the most important species in the tree stratum. In 2001, red oak has declined to a rank of third in im-

portance (Table 1). There are few oak saplings and fewer seedlings for replacement (Tables 2 and 4). The mature individuals of red oak are a small number of large diameter trees, expressed in their high relative dominance.

As the oaks have declined, *Acer saccharum* (sugar maple) has risen in importance. A multitude of small-diameter sugar maples generates the high I.V. In 1976 there was a low I.V. for sugar maple saplings (Table 2). A higher I.V. for sugar maple saplings is expected as the current trees have just recently grown to tree diameter.

The trees and seedlings of the *Fraxinus* (ash) spp. in College Woods were difficult to distinguish. Often the twigs were either inaccessible or immature but those found showed possible hybridization of *F. americana* (white ash) and *F. pennsylvanica* (green ash). Even so, ash species have maintained a high importance in all strata since 1976. Ash has been the second most important species in the tree stratum for the past 25 years (Table 1) and most important tree in the herb layer (Table 4). Additionally, white ash has held the highest I.V. for saplings at 99.1 in 1976 and 88.4 in 2001 (Table 2).

Among the trees, *Prunus serotina* (black cherry) has shown no increase in importance since 1976 (Table 1). This is contrary to Nowak's (1976) prediction that "black cherry will probably increase in importance." Black cherry has been second in importance among saplings and currently accounts for more than 25% of the frequency, density, and dominance (Table 2).

Four of seven species present in the shrub layer were exotics. *Rhamnus cathartica* (common buckthorn), the leading shrub exotic, increased in importance from 44.7 in 1976 to 228.3 in 2001 (Table 3). This dramatic increase may be contrasted with *Cornus racemosa* (gray dogwood), which declined from an I.V. of 103.0 in 1976 to 5.4 presently (Table 3). The remaining exotics include *Rhamnus frangula* (glossy buckthorn), *Viburnum opulus* (European cranberrybush) and various escaped honeysuckles: *Lonicera maackii*, *L.* ×*bella*, *L. morrowi* and *L. tartarica*.

Arisaema triphyllum (jack-in-the-pulpit), *Circaea lutetiana* (enchanter's nightshade) and *Geum canadense* (white avens) were the three most important herbs in 2001 with values of 17.9, 17.5 and 15.6 respectively (Table 4). The most important, jack-in-the-pulpit, has recently become prominent. Enchanter's nightshade and white avens sequentially held the 2 highest I.V. in 1976 at 20.8 and 12.6 (Table 4). All these herbs reach their highest presence in southern dry-mesic forests (Curtis 1971).

The shrubs under 0.5 m tall in the herb layer show a trend similar to that of the shrub stratum, where common buckthorn replaces gray dogwood. Presently, common buckthorn has an I.V. of 30.7, and gray dogwood is sparsely present in the stand, but does not appear in sample plots as an herb (Table 4). In 1976 as shrubs under 0.5 m tall, gray dogwood had the highest I.V. of 24.1, and common buckthorn had an I.V. of 3.7 (Table 4).

The most important seedlings were ash spp., sugar maple, and black cherry with I.V. of 27.8, 23.6 and 18.8 respectively (Table 4). In 1976, ash spp. had the greatest I.V. of 16.1 with black cherry second at 8.7.

TABLE 1. Sampling data for trees in College Woods, Wehr Nature Center, with comparison between 2001 and 1976.

	2001				1976			
Species	Relative Frequency	Relative Density	Relative Dominance	Importance Value	Relative Frequency	Relative Density	Relative Dominance	Importance Value
Acer rubrum	8.0	5.1	6.9	20.0	3.0	2.5	2.7	8.2
Acer saccharum	16.0	23.1	17.7	56.8	7.0	5.0	9.9	21.9
Fraxinus spp.	2.50	35.9	32.7	93.6	7.7	5.1	3.1	15.9
Juglans nigra	10.0	6.4	9.5	25.9	9.0	6.3	5.9	21.2
Prunus serotina	8.0	5.1	4.0	17.1	10.0	10.0	2.2	22.2
Quercus rubra	12.0	11.5	23.7	47.2	17.0	17.5	45.4	79.9
Tilia americana	14.0	15.4	11.5	40.9	7.0	7.5	1.7	16.2
Ulmus americana	1.20	10.3	7.8	30.1				
Ulmus rubra	4.0	2.6	1.3	7.9	9.0	7.5	1.2	17.7

TABLE 2. Sampling data for saplings in College Woods, Wehr Nature Center, with comparison between 2001 and 1976.

	2001				1976			
Species	Relative Frequency	Relative Density	Relative Dominance	Importance Value	Relative Frequency	Relative Density	Relative Dominance	Importance Value
Acer saccharum	5.7	1.9	4.7	12.3	1.3	0.3	0.1	1.7
Crataegus spp	2.9	1.0	6.0	9.9	9.2	7.0	5.9	22.1
Fraxinus americana	22.9	32.7	32.9	88.4	23.7	43.1	32.3	99.1
Fraxinus pennsylvanica	8.6	8.7	2.0	19.2	5.3	2.3	1.4	9.0
Ostrya virginiana	2.9	1.0	2.7	6.5	7.9	5.7	15.7	29.3
Populus tremuloides	2.9	1.9	2.0	6.8	1.3	0.7	0.6	3.9
Prunus nigra	20.0	23.1	16.8	59.9				
Prunus serotina	28.6	27.9	24.2	80.6	15.8	22.4	11.6	49.8
Quercus rubra	2.9	1.0	4.7	8.5	6.6	2.3	6.2	15.1
Tilia americana	2.9	1.0	4.0	7.8	7.9	6.0	8.4	22.3

TABLE 3. Sampling data for shrubs in College Woods, Wehr Nature Center, with comparison between 2001 and 1976.

	2001				1976			
Species	Relative Frequency	Relative Density	Relative Dominance	Importance Value	Relative Frequency	Relative Density	Relative Dominance	Importance Value
Cornus racemosa	3.3	1.1	1.0	5.4	14.8	56.0	32.2	103.0
Lonicera spp.	6.7	1.1	1.0	8.7	1.7	0.6	0.4	2.7
Rhamnus cathartica	53.4	86.9	88.0	228.3	9.6	3.5	31.6	44.7
Rhamnus frangula	6.7	1.1	1.0	8.7	0.9	0.2	0.3	1.4
Ribes missouriense	23.3	7.7	6.7	37.7	10.4	16.0	6.1	32.5
Viburnum opulus	3.3	1.6	1.4	6.4				
Zanthoxylum americanum	3.3	0.5	1.0	4.8	6.1	0.7	1.3	8.1

TABLE 4. Sampling data for herb layer (i.e., all plants < 0.5 m tall) in College Woods, Wehr Nature Center, with comparison between 2001 and 1976.

	2001			1976		
Herb Species	Relative Frequency	Relative Cover	Importance Value	Relative Frequency	Relative Cover	Importance Value
Agrimonia gryposepala	1.6	0.1	1.7			
Alliaria petiolata	10.9	0.5	11.4			
Arisaema dracontium	4.7	0.2	4.9			
Arisaema triphyllum	15.6	2.3	17.9			
Carex blanda	1.6	0.1	1.7	1.4	6.3	7.7
Carex hirtifolia	1.6	2.0	3.6	1.4	6.3	7.7
Circaea lutetiana	15.6	1.9	17.5	7.5	13.3	20.8
Fragaria virginiana	1.6	0.1	1.6	4.1	3.7	7.8
Geranium maculatum	3.1	0.2	3.3			
Geum canadense	14.1	1.5	15.6	6.8	5.8	12.6
Glyceria sp.	1.6	0.1	1.6	0.7	0.7	1.4
Oxalis stricta	3.1	0.2	3.3	0.7	0.2	0.9
Sanicula gregaria	4.7	0.5	5.1			
Smilacina racemosa	10.9	1.1	12.1	1.4	2.3	3.7
Smilax herbacea	4.7	0.2	4.9			
Solidago flexicaulis	1.6	0.1	1.6			
Polygonum virginianum	1.6	0.2	1.7			
Shrub species						
Cornus racemosa	3.4	0.1	3.5	8.2	15.9	24.1
Lonicera spp.	3.4	0.3	3.7	0.7	0.7	1.4
Parthenocissus sp.	24.1	2.2	26.3	8.2	9.6	17.8
Rhamnus cathartica	27.6	3.1	30.7	2.7	1.0	3.7
Rhus toxicodendron	3.4	0.2	3.7	1.4	2.3	3.7
Ribes missouriense	10.3	0.2	10.5	0.7	0.2	0.9
Rubus occidentalis	3.4	0.1	3.5	2.1	2.0	4.1
Viburnum opulus	17.2	0.4	17.7			
Viburnum rafinesquianum	6.9	0.1	7.0	0.7	0.2	0.9
Tree Species						
Acer saccharum	22.7	0.8	23.6			
Fraxinus spp.	27.3	0.5	27.8	9.6	6.5	16.1
Ostrya virginiana	4.5	0.1	4.6			
Prunus nigra	13.6	0.9	14.5			
Prunus serotina	18.2	0.7	18.8	4.1	4.6	8.7
Quercus rubra	4.5	0.1	4.7	0.7	0.2	0.9
Ulmus americana	4.5	0.1	4.6	2.1	2.2	4.3
Ulmus rubra	4.5	0.1	4.6			

DISCUSSION

The transition of prominent overstory trees in College Woods from oak-dominated to maple-dominated is similar to the changes documented in numerous other studies (Peet & Loucks 1977; Abrams 1992; Curtis & McIntosh 1951). Given the similarity of College Woods to stands in these studies, replacement of oaks by maples is typical. Abrams (1992) attributes the decline of oak in these

communities to disease and cessation of fire, which is what appears to have happened in College Woods as well.

The low I.V. of sugar maple saplings in 1976 compared to the high IV of present day sugar maple trees is possibly a result of favorable growing conditions. Under such conditions, sugar maple could germinate, grow, and reach the sizes observed in College Woods within 25 years. However, no data were collected between 1976 and the present to support this. Since no permanent plots exist in College Woods it is also possible that the boundaries of my 2001 study could have extended into an adjacent area containing a higher density of sugar maple which was not part of the 1976 study area.

Nowak (1976) cites two studies that demonstrated white ash being more important in urban settings with higher human use than sugar maple (Forman & Elfstrom 1975; Levenson & Matthiae 1976, cited in Nowak 1976). Nowak suggests the abundance of ash spp. in College Woods is the result of the stand's proximity to the Village of Hales Corners and surrounding suburban area. She correctly predicted an increase in ash spp. I propose the increase in ash is a function of both the proximity to an urban area and the seasonal ponding that inundates College Woods.

The slow growth of black cherry, resulting in a small size class in College Woods, is a characteristic of southern Wisconsin black cherry populations, as they tend to remain suppressed for 40-60 years (Auclair & Cottam 1971) until canopy gap opportunities allow for accelerated growth.

The rise of jack-in-the-pulpit is, as in the case of the maples, presumably due to favorable growing conditions. However, the abundance could be a result of deer browsing on the surrounding species. Enchanter's nightshade and white avens have remained important for 25 years and are prevalent species in southern dry-mesic forest communities (Curtis 1971). They are likely to remain important unless out-competed by invasive exotic species.

As seen in the data, exotic invasive species are abundant in College Woods. Deer avoid browsing common buckthorn; and, with the exclusion of fire (Laastch & Anderson 2000), common buckthorn out-competes the native shrub species. A visual inspection of College Woods shows the stand dominated by invasive species. Areas where *Alliaria petiolata* (garlic mustard) exists have become virtual monocultures of this species. I predict that patches of garlic mustard will follow the same trend as common buckthorn and continue to expand throughout the entire herb stratum, eliminating native species.

McCune and Cottam (1985) credit successional outcome to stochastic events. They concluded that no model could predict the changes that occurred in their study area. This holds true in College Woods; however, in a general sense, College Woods follows a rather predictable pattern of overstory replacement. The decline of red oak created canopy gaps permitting opportunist species like black cherry to establish and quickly reach a sapling stage. The cessation of fire has allowed fire-intolerant, shade-tolerant species like sugar maple and ash to encroach and shade out the less shade-tolerant species. The suppression of the shade-intolerant species reinforces the shade-tolerant species' ability to outcompete the intolerant species in a continuing cycle. Within the mix, invasive exotic species are out-competing native species and dominating the shrub and

herb layers. I predict, based on the trends of the past 25 years, that College Woods (if maintained under static management) will change from an oak-dominated overstory community to a shade-tolerant maple-dominated overstory. The understory, with its current infestation of invasive species, will likely continue to be saturated with exotic shrubs and herbs, perhaps leading to a monoculture condition seen in the localized patches of invasive exotics at College Woods.

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ORTHOTHECIUM DIMINUTIVUM DISCOVERED AT SCOTT'S FALLS IN ALGER COUNTY, MICHIGAN

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Scott's Falls is already a famous bryophyte site, with the intriguing *Schistostega pennata* (Hedw.) Web. & Mohr adorning the ceiling of the cave behind the falls and on adjacent ledges (Crum 1976). Now another interesting find—the first occurrence east of the Rockies for *Orthothecium diminutivum*, a relatively rare moss even in its native western distribution of Colorado, Utah, Oregon, and Washington.

Orthothecium diminutivum (Grout) Crum, Steere, & Anderson (Plagiotheciaceae; Crum et al. 1964), formerly known as *Holmgrenia diminutiva* Grout, was discovered 23 March 2001 at Scott's Falls adjacent to M28 and Lake Superior in Alger County, Michigan (46°26′N, 86°48′W, T47N, R20W, Sec 28). Scott's Falls is a small waterfall over very porous basalt and granite approximately 3 m wide with about a 5 m drop. The area is heavily shaded, very damp, and somewhat covered with and protected by larger trees of the surrounding northern hardwoods stand, including yellow birch (*Betula allegheniensis*), sugar and red maple (*Acer saccharum, Acer rubrum*), aspen (*Populus tremuloides*), white spruce (*Picea glauca*), and northern white cedar (*Thuja occidentalis*). The dominant ground vegetation includes the ferns *Onoclea sensibilis, Dryopteris spinulosa, Gymnocarpium dryopteris,* and *Phegopteris hexagonoptera. Orthothecium diminutivum* was growing in one of the more shaded and moist areas on organic matter between rocks and roots. Dominant bryophytes growing with it include *Polytrichum* sp. and *Conocephalum conicum.*

The population of *Orthothecium diminutivum* exhibited many capsules and numerous perichaetia but no perigonia. Crum commented when he studied the specimens that perhaps Lawton (1971) was correct, that it is indeed dioicous, whereas Flowers (1936) considered it to be monoicous. On the other hand, Crum added that the numerous capsules would suggest that it is more likely to be monoicous.

The voucher specimens of *Orthothecium diminutivum* from Scott's Falls are deposited in the Herbarium at Michigan Technological University (accession number MCTC #11883) and at the University of Michigan (MICH). The type specimen is located in the herbarium at Duke University, where Grout's private herbarium is now housed.

Comment from Janice Glime: I have never had the privilege of sharing authorship with Howard Crum, for he always politely declined after graciously

sharing his time and knowledge in verifying my doubtful specimens. Only a few months before his death, he once again came to my rescue in identifying this troublesome species. And once again, he declined, before I could even ask, saying "If you should ask, I have enough unfinished business that I would rather not be an author." Contrary to his request, I have taken the liberty of including him as a co-author, posthumously, for without his kind identification and thoughtful comments, this publication might never have existed.

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ORTHOGRAPHY OF THE SCIENTIFIC NAME OF THE HYBRID BANEBERRY, *ACTAEA ×LUDOVICI* (RANUNCULACEAE)[1]

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The baneberry hybrid *Actaea pachypoda* Ell. ×*A. rubra* (Ait.) Willd. was given the binomial *Actaea ×Ludovici* [sic] by Boivin in 1967. Morton and Venn (1990) and Kartesz and Meacham (1999) have adhered to Boivin's original orthography except for the capitalization. Other authors have used the amended spelling *ludovicii*, following Index Kewensis, Supplement XV (Heslop-Harrison 1974). References in which the amended spelling appears include the Flora of Canada (Scoggan 1978), Flora of North America North of Mexico (Ford 1997), the Ontario Plant List (Newmaster et al. 1998), and the International Plant Names Index (web site, as of 2003).

Actaea ×ludovici was named for Père Louis-Marie (né Louis Lalonde, 1896–1978), a faculty member for many years at l'Institut Agricole d'Oka, in Oka, Québec, who was one of the collectors of the type specimen. The epithet *ludovici* is a Latinization of Louis, and is a second-declension, singular noun in the genitive case.

The familiar *-ii* genitive ending is correct when a name in the masculine gender already in Latin form, or as hypothetically Latinized, ends in *-ius* in the nominative case. The first *i* is retained from the root of the noun; the second *i* is an ending denoting the genitive case. In Classical Roman usage the second *i* was sometimes dropped, but in botanical Latin it is consistently retained, as in *Oxalis dillenii* Jacq., named for Johann Jakob Dillenius. When a name in Latin form, whether from the Classical period or more recent, ends in *-us* not directly preceded by an *i*, the root of the noun does not contain a terminal *i* to be retained. The genitive ends in the single *i* that constitutes the case ending, as in *Abutilon theophrasti* Medik., named for Theophrastus of Eresus, and *Gentianella hieronymi* (Gilg) Fabris, named for Georg Hans Emmo Wolfgang Hieronymus.

The correct orthography of the baneberry epithet *ludovici* is determined, therefore, by that of the Latinization of Louis. The standard Latinization or Latin cognate is Ludovicus, as indicated in such references as Botanical Latin (Stearn 1983, p. 72) and the unabridged Funk and Wagnall's Standard Dictionary. The genitive of *Ludovicus* is *ludovici*. The original orthography used by Boivin is the

[1] Contribution No. 111 from the Royal Botanical Gardens, Hamilton, Ontario, Canada.

correct orthography, in accord with Article 60 of the International Code of Botanical Nomenclature (St. Louis Code), including Recommendation 60C.

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On the cover: *Invasive understory of* Rhammus cathartica *in oak woods at Highknocker Park, Green lake, WI, 5 January 2003; Thomas L. Eddy, photographer.*

October, 2003

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THE VASCULAR PLANTS OF TAYLOR COUNTY, WISCONSIN

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To my son, Asa
May your generation possess the
Earth-wisdom so many of mine lacked.

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INTRODUCTION

. . . Solomon was a strong-minded man . . . the very wisest man the world ever saw, and yet he considered it was worth while to study plants . . . not only the great cedars of Lebanon, but little bits of things growing in the cracks of the walls.

John Muir, *A Thousand Mile Walk to the Gulf*

The major part of this work is an annotated checklist of vascular plants growing or known to have grown outside of cultivation in Taylor County, Wisconsin. The list is based on field work in the years 1993–1997 and specimens at several Wisconsin herbaria. It includes the great white pines that once towered over all other trees (and still do in a few places) in the primeval forest that once covered this land, as well as the "little bits of things growing in the cracks of walls," many of which arrived later with the European invaders. It aspires to be a complete list but ultimately fails in this, as all similar works fail, because the flora is ever-changing and there are always new and overlooked species to be discovered.

Taylor County has long been a blank spot on too many species range maps, especially considering the large amount of public land within its borders. The reasons for this are not entirely clear but likely have to do with its location in the state—far from the populated south, but not quite "up north," everyone's favorite vacation destination—and with the false perception that this area lacks interesting botanical sites and natural areas. With the notable exception of Lincoln County, adjacent counties also lack comprehensive vascular plant surveys. Even in a well-botanized state such as Wisconsin, there is much yet to be done before we have a complete picture of the flora.

The aim of this work is to provide baseline information that will help docu-

ment floristic changes in these days of global warming and other large-scale disturbances. It should also be useful in helping to define the county's place within the state and regional flora, an interesting one, since Taylor County's flora includes elements characteristic of the southern part of the state as well as the northern.

A specific effort was made to locate as many rare plant populations and high-quality sites as possible, especially on public lands where lie their best prospects for protection. As a result, numerous hitherto unknown sites for rare species were found, including some that were quite unexpected.

Perhaps most important, I hope this work will help stimulate more local interest in Taylor County's surprisingly rich flora—interest that will translate into protection efforts. Too much of the natural world is being lost too quickly. Those who come after us will live in an increasingly impoverished environment unless many more concerned citizens take an active role in preserving what remains and restoring a large measure of that which has been lost.

LOCATION AND AREA

Taylor County is located in the north-central part of Wisconsin (Fig. 1), bounded approximately by 45° 2′ and 45° 23′ North Latitude and 90° and 91° West Longitude. A few miles to the southeast, in Marathon County, a geological marker notes the location of 45°N 90°W—the exact center of the northern half of the western hemisphere.

The county consists of 27 government townships (22 civil towns) (Fig. 2) with a total area of approximately 979 square miles (2536 km^2) (Wisconsin Legislative Reference Bureau 1997) or about 623,900 acres (252,484 ha) (Schmidt 1997). The 4th principal meridian and the 3rd correction line intersect in the county, resulting in some misalignment of township boundaries. Dimensions are approximately 24 miles (38.6 km) north to south by 43 miles (69.2 km) east to west.

Public lands (Fig. 3) total about 150,000 total acres (60,703 ha), including 122,480 acres (49,566 ha) in the Medford District of the Chequamegon National Forest, 17,568 acres (7,110 ha) of Taylor County Forest, and 7,686 acres (3,110 ha) in the Pershing State Wildlife Area (acreage figures obtained from staff at respective government agencies and current as of May 1997).

POPULATION AND LAND USE

Taylor County's 2000 population was 19,668, up from 17,843 in 1960 (U.S. Census Bureau figures), for an approximate density of 20.2/$mile^2$ (7.8/km^2). The county seat and only city is Medford, with an estimated 2002 population of 4,270, followed by the villages of Rib Lake (870), Stetsonville (551), Gilman (470), and Lublin (108).

Two major state highways (Highways 13 and 64), a network of secondary

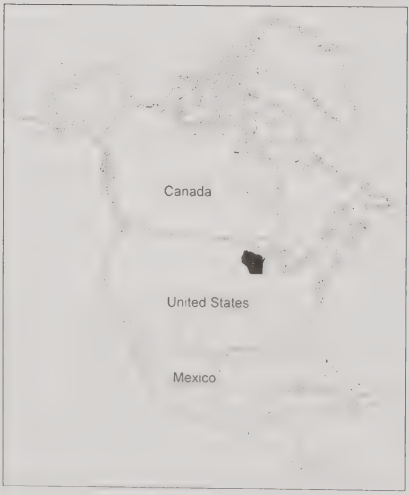

FIGURE 1. Location of Taylor County within Wisconsin and North America.

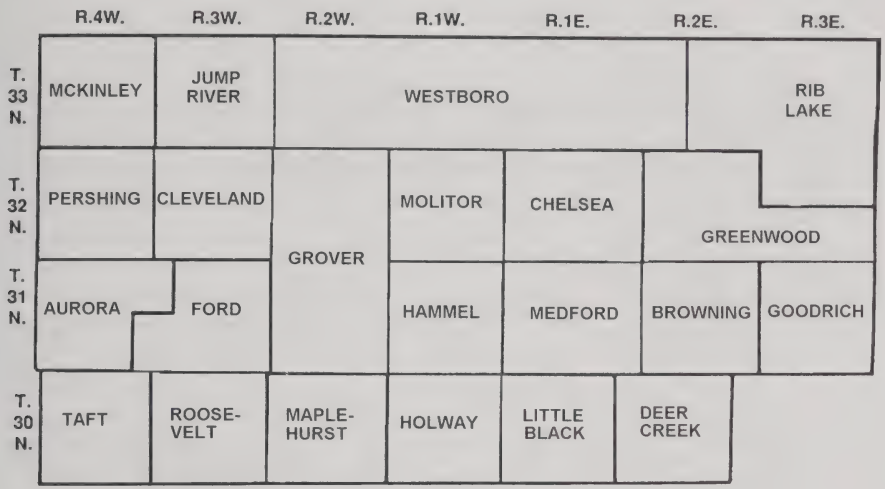

FIGURE 2. Taylor County civil towns.

paved roads, and the Wisconsin Central Division of the Canadian National Railway serve the county (Fig. 4.).

Approximately 368,100 acres (148,965 ha), or 59 percent, of the county is forested (Schmidt 1997). According to the Wisconsin Department of Revenue, 131,424 acres (53,185 ha) are tillable, 55,592 acres (22,497 ha) are in pasture, and 741 acres (300 ha) are used for manufacturing (including gravel pits). The county had 1,090 farms in 1995, down from a high of 3,300 in 1940 (Boelter, forthcoming). Most of these were dairy farms.

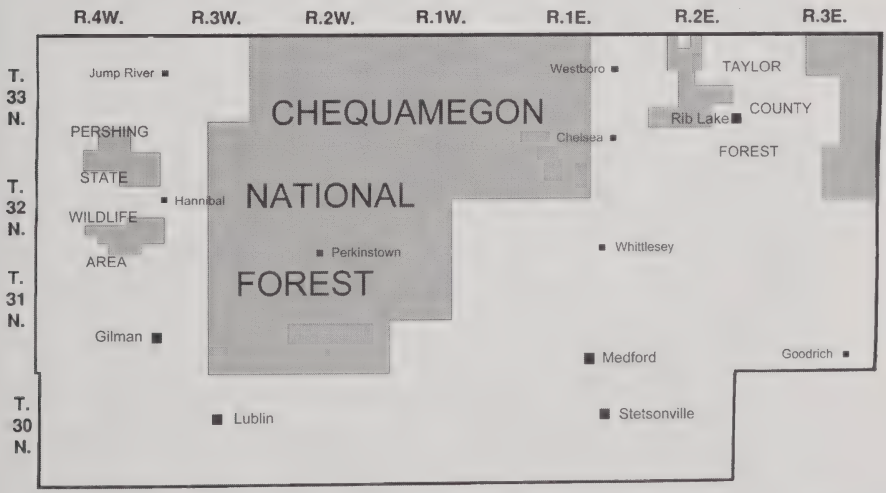

FIGURE 3. Major public lands in Taylor County (boundaries approximate and private inholdings not shown).

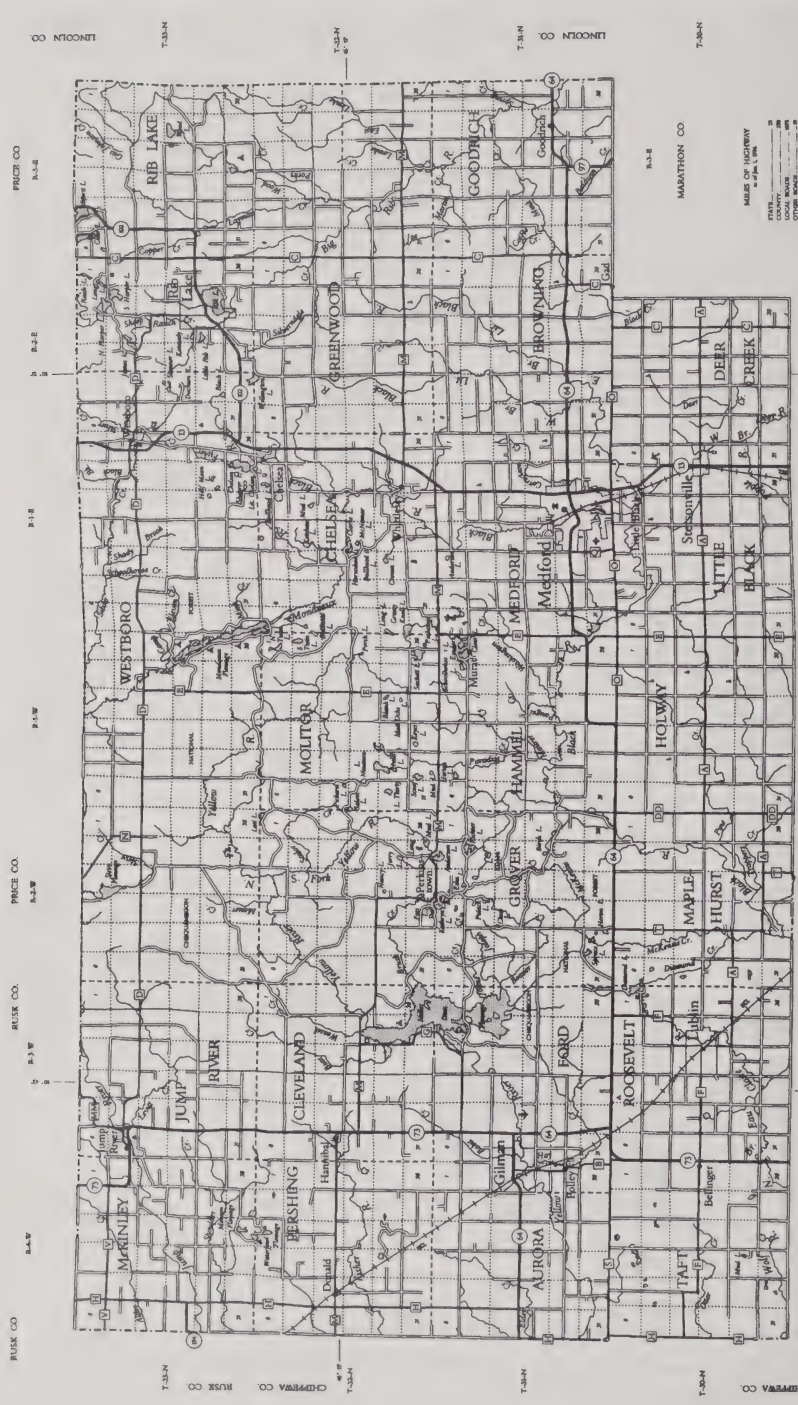

FIGURE 4. Taylor County, Wisconsin, road map (adapted from WI Dept. of Transportation, 1998).

PHYSICAL DESCRIPTION

Elevation

The county's highest elevation, at 1840 feet (560.8 m), is in the northeast, just north of James Lake, on the terminal moraine of the Chippewa Lobe of the Laurentide Ice Sheet (Wisconsin Glaciation). Timm's Hill, the state's highest point, with an elevation of 1,951.5 feet (594.8 m), is located on the same moraine, 6 miles north in Price County.

The lowest elevation, approximately 1104 feet (336.5 m), is at the point where the southwest-flowing Jump River crosses the Chippewa-Taylor county line, in the north-western part of the county.

Climate

Taylor County's climate is classified as humid/temperate continental, a climate type characterized by cold, snowy winters and warm, relatively short summers.

Three major air masses control the weather in this area: the Continental Polar air mass forms over land in the Arctic and results in cold, dry winter weather and cool conditions in summer. The Maritime Tropical air mass originates over the Gulf of Mexico and brings hot, humid weather in summer and warm, moist weather in winter. Finally, the Maritime Polar air mass forms in the North Pacific and carries much moisture, most of which is lost on the western slope of the Rockies. It generally brings mild, relatively dry weather to our region (Albert 1995).

Prevailing winds are southerly in summer and from the west and northwest in winter. Average precipitation is approximately 33.20 inches/year (84.33 cm/year), 60 percent of which occurs in the period May through September. Weather records have been recorded at Medford since 1892.

The following means are for Medford and are based on data from the years 1971–2000, compiled by the State Climatology Office in Madison:

Temperature:	Monthly—41.2° F (5° C)
	Coldest month—January, 9.7° F (–12° C)
	Warmest month—July, 68.0° F (20° C)
Precipitation:	Wettest month—September, 4.5 in. (11.43 cm)
	Driest month—February, 0.91 in. (2.31 cm)
	Snowfall, yearly average—40.3 in. (102.36 cm)
Last spring freeze	16 May
First fall freeze	23 September
Growing season	136 days (between frosts)
Growing degree days	2327 (for corn, 50° F (10° C) base temperature)

Following are some weather extremes recorded at Medford:

Temperature:	Highest—104° F (40° C), 13 July 1936
	Lowest— -45° F (-42.8° C), 10 February 1999
Precipitation:	Wettest year—46.36 in. (117.75 cm), 1942
	Driest year—16.46 in. (41.81 cm), 1910

FIGURE 5. A Precambrian rock outcrop along the Rib River near Goodrich.

Most in 24 hour period—8.00 in. (20.32 cm), 5 June 1905
Most snowfall, July-June—91 in. (231.14 cm), 1950–1951
Snowfall, one day—12 in. (30.38 cm), 5 February 1971

Bedrock Geology

Taylor County is at the southern edge of an area of North America known as the Canadian Shield. Comprising most of the eastern half of Canada, as well as parts of the Great Lakes region in the U.S., this is a geologically stable area where very old Precambrian rocks are exposed at the bedrock surface (though mostly covered with glacial drift in Wisconsin). Most of that portion of the Canadian Shield occurring within Wisconsin underlies a geographical province long known as the Northern Highland (Martin 1965), of which Taylor County is a part. In Wisconsin, the Shield is sometimes further subdivided. The county is included in one such division called the Central Shield Area (Schultz 1986), characterized by a complex diversity of metamorphosed volcanic and sedimentary rocks. In addition, granitic rocks intrude in the Jump River, Rib Lake, and Goodrich areas (Mudrey et al. 1987).

Precambrian rocks of various types outcrop in numerous places along the

Black, Yellow, Jump, and Rib Rivers. The largest of these is along the Rib River, near Goodrich, in the southeastern corner of the county. Here, the Rib River is restricted to a picturesque gorge-like narrows known locally as the Goodrich Dells (Fig. 5).

Immediately to the south, in Clark County, the rocks of the Canadian Shield are overlaid with Cambrian sandstones, with a few outliers occurring in Taylor County. One of these outcrops fairly extensively along the Yellow River, below Gilman.

Glacial Geology

Attig (1993) recently completed a study of the county's Pleistocene geology; his work is the basis for the following summary. As in most of Wisconsin, Taylor County's surface features have been sculpted by ice. At least three glaciation events are represented. Roughly the northwestern three-fifths of the county was covered by the Laurentide Ice Sheet during the last part of the Wisconsin Glaciation (Fig. 6), while the southeast was glaciated at least twice earlier in the Pleistocene.

The Chippewa Lobe of the Laurentide Ice Sheet, and its offshoot, the Black River Lobe, reached its maximum extent in north-central Wisconsin about 25,000 to 15,000 years B.P. Upon receding, it left a prominant southwest to northeast-trending terminal moraine that divides the county in half and forms a backdrop for many a Taylor County scene (Fig. 7). Called the Perkinstown Moraine, this region of steep hills and kettle lakes varies from about three to ten miles in width. The smaller Wisconsin Valley Lobe created a similar topography in the northeastern corner of the county—the Wood Lake Moraine. On either side of this "marginal zone" are areas of ground moraine, called till plains (Fig. 8). Though the southeastern till plain was deposited much earlier, during previous glaciations, and has undergone considerable weathering and erosion, it has the same gentle, rolling character as the till plain to the northwest, formed during the recession of the Chippewa Lobe (Fig. 10).

Glacial landforms in the area covered by the Chippewa and Wisconsin Valley Lobes are well preserved and include hilly collapse topography, ice-walled-lake plains, eskers, and, possibly, drumlins.

As the Laurentide Ice Sheet wasted back, marginal ice, covered with an insulating layer of debris, became isolated and persisted perhaps for several thousand years. Ice-walled lakes formed on the ice in many places and slowly filled with sediments from meltwater flowing off the surrounding ice surface. Eventually, the ice walls melted and the lakes drained. If a lake bottom was on ice, the sediments collapsed and along with numerous buried ice blocks formed the hilly collapse topography characteristic of the marginal zone. However, if a lake bottom was on solid till, the sediments then remained as an ice-walled-lake plain, typically with a relatively level, stone-free surface somewhat higher than the surrounding hilly terrain. Because of their fertile soils and flat surfaces, most ice-walled-lake plains today are islands of agriculture in a rugged, forested landscape.

Eskers were formed from sediments deposited by meltwater in tunnels beneath the ice surface. These sinuous, gravelly ridges can extend for several miles

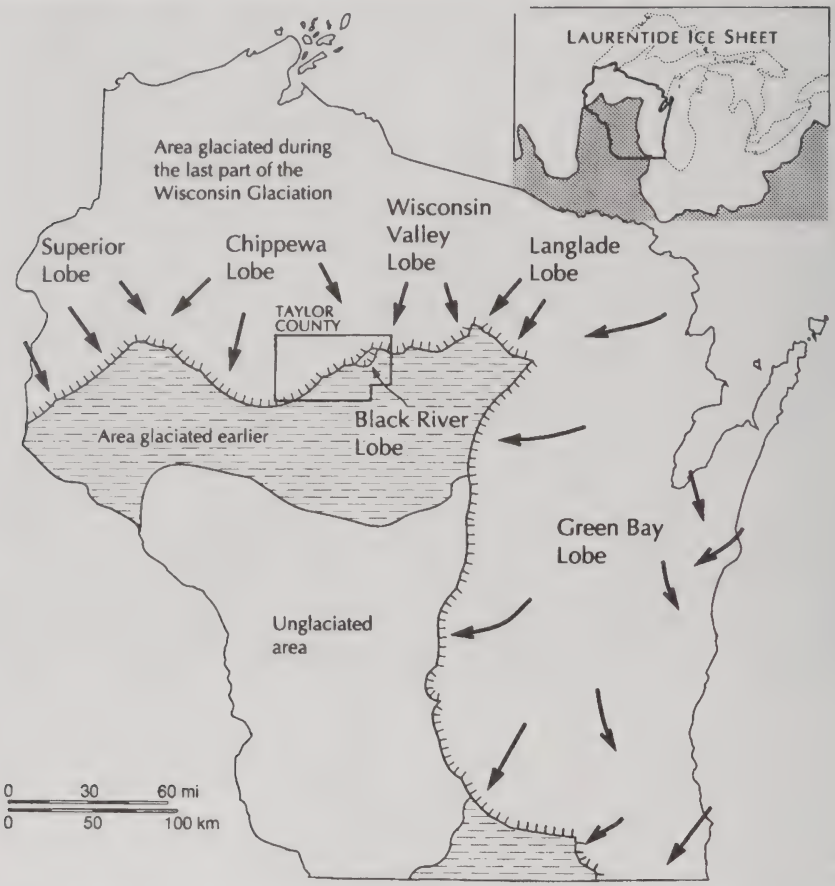

FIGURE 6. Maximum extent of the Laurentide Ice Sheet during the last part of the Wisconsin Glaciation. Arrows indicate direction of ice flow (from Attig 1993).

and rise 40 feet or more above the surrounding terrain. Taylor County has two very prominent eskers—the Mondeaux (Fig. 9) and Steve Creek eskers—and probably many smaller ones. Because they are easily-exploited gravel sources, some eskers have been destroyed.

The origin of low, elongate hills in the northwestern corner of the county remains unclear, but Attig (1993) suggests that they are drumlins. Because they are oriented in a northeastern-southwestern direction, perpendicular to the direction of ice movement in the Chippewa Lobe, they must have been formed in a later readvance of the ice sheet.

Soils

A detailed soil survey of the county is in progress at the time of this writing, with completion date uncertain. A generalized soil map is also under develop-

FIGURE 7. A portion of the Perkinstown Moraine, looking south, with Silver Creek in the middle foreground.

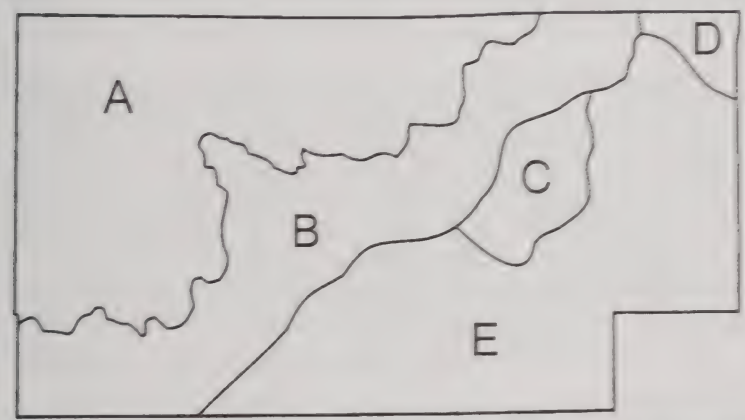

FIGURE 8. Glacial landscape areas of Taylor County: A: till plain of Chippewa Lobe. B: marginal zone of Chippewa Lobe (Perkinstown Moraine). C: Black River Lobe. D: marginal zone of Wisconsin Valley Lobe (Wood Lake Moraine). E: older till plain (adapted from Attig 1993).

ment. Hence, the information presented here is somewhat preliminary and incomplete and largely taken from Boelter (in preparation), with additional information from Attig (1993), Kempf (1985), and Knight (1996). For convenience, the soils of Taylor County may be placed into three general soil regions: the till plains, the marginal zone, and wetland soils. Brief descriptions follow.

Soils of the Till Plains

Previously known as northern silt loams (Hole 1980), these soils occupy the level to gently rolling areas of ground moraine, called till plains, northwest and

FIGURE 9. The Mondeaux Esker forms a prominent skyline in this view looking east from Highway E.

southeast of the Perkinstown Moraine (Fig. 8). The area southeast of the moraine is composed of older till, while that to the northwest was deposited during the last major advance of the Laurentide Ice Sheet. In both, the till is generally an acidic sandy loam derived from rocks of the Lake Superior basin. East of Stetsonville there is an area of still older, calcareous till probably derived from Cretaceous formations to the northwest, in Manitoba, North Dakota, and Minnesota. Surface layers, however, have long been leached of carbonate.

Both the older and the most recently formed till plains are covered with a layer of windblown silt, or loess, deposited after stabilization of the landscape following recession of the ice sheet. Though it varies, the loess layer is typically about 0.5 m thick.

The silt loam soils of the till plains are generally of medium to high fertility but tend to be somewhat poorly drained because of low surface relief. With proper management and the addition of soil amendments, farming, especially dairy, is often successful (Fig. 10). Major soil associations include Withee-Loyal-Marshfield, Magnor-Freeon-Crystal Lake, Almena- Magnor-Freeon, and Magnor-Freeon-Padus silt loams. Vilas-Pence sandy loams occur along the Jump River.

Soils of the Marginal Zone.

These soils are found on the marginal zone, that area occupied by the terminal moraines of the Chippewa and Wisconsin Valley Lobes of the Laurentide Ice Sheet: the Perkinstown and Wood Lake Moraines, respectively (Fig. 8). The marginal zone, with its hilly topography, has the thickest glacial sediments in the county—up to 65 m in the Perkinstown area. Formed from glacial till and sand and gravel outwash, soils here tend to be acidic and gravelly or stony. As on the till plains, the surface is sometimes capped with a layer of loess. Soils are of

FIGURE 10. Soils of the gently rolling till plains are suited for dairy farming.

medium fertility (though richer on ice-walled-lake plains) and predominently well drained, but with many small ice block depressions with poor drainage. Soil associations represented include Newot-Newood-Comstock sandy loams, Poskin-Rib-Brill and Freeon-Magnor silt loams, and Crystal Lake-Comstock-Barronett lacustrine silt loams on ice-walled-lake plains.

Except for ice-walled-lake plains, soils of the marginal zone are mostly too poor or rocky or the terrain too steep for farming, other than pasturing (Fig. 11). Consequently, most of this area remains forested.

Soils of Major Wetlands and Stream Bottoms.

These include organic soils (also called bog soils or peats and mucks) and wet alluvial soils. Only a few of the areas occupied by wetland soils are large enough to show up on a generalized soil map. Kidrick Swamp, which is primarily a large sphagnum bog, or muskeg, in the northwestern part of the Chequamegon National Forest, is one such area of organic soils. Numerous smaller ones are found throughout the county. The Perkinstown Moraine, especially, is characterized by many small bogs and swamps. The poorly-drained Fordum silt loams are common alluvial soils on floodplains.

Drainage and Surface Waters

Much of the information in this section is taken from Haanpaa et al. (1970). Taylor County is drained by parts of three major state river systems: the Wisconsin, the Chippewa, and the Black (Fig. 12). The Perkinstown Moraine, running northeast to southwest through the center of the county, forms a natural drainage divide. Southeast of the moraine, water flows to the Rib River—part of

FIGURE 11. Pasturing beef cattle on the Perkinstown Moraine.

the Wisconsin River system—and to the Black River. To the northwest, the Yellow, Jump, and Fisher Rivers all drain to the Chippewa River.

The county has 67 named streams, with a combined length of 494 miles (795 km) and area of 1,248 surface acres (505 ha). In addition, there are numerous smaller unnamed, mostly intermittent, streams. Stream waters range in pH from 6.2–7.4. The average gradient is 22 feet per mile (4.2 m/km). Further information on the county's four major streams follows.

Black River

From its headwaters at Black Lake in the Town of Westboro, the Black River flows south and west for 183 miles (294.5 km) to its confluence with the Mississippi River near La Crosse. With nearly 50 miles (80.5 km) within the county, this hard water stream is longer and drains a larger area than any other. Below Medford it joins with the Little Black River, becoming a low gradient meandering stream with extensive wooded bottomlands dominated by silver maple (*Acer saccharinum*) (Figs. 13 & 31). Several plant species with affinities more southern find suitable habitat in the rich floodplains along the Black, including *Celtis occidentalis*, *Dioscorea villosa*, *Arenaria lateriflora*, *Polemonium reptans*, *Erythronium albidum, Agastache scrophulariifolia*, *Polygonum virginianum*, and *Arisaema dracontium*. Small rock outcrops occur in a few places.

Yellow River

This soft water stream begins at the confluence of the North and South Forks of the Yellow River and flows southwest into Chippewa County where it joins

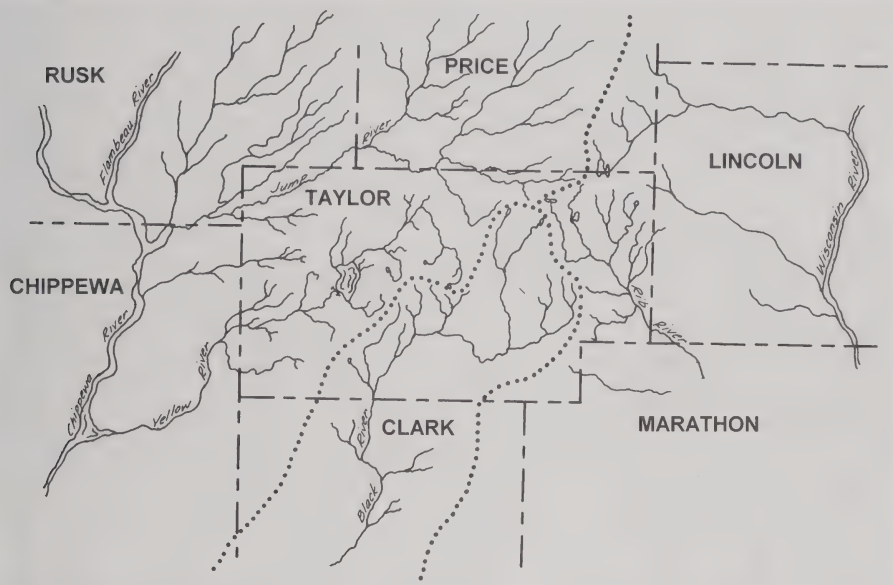

FIGURE 12. Drainage of Taylor County and adjacent areas. Dotted lines separate major watersheds (adapted from Haanpaa et al. 1970).

the Chippewa River. The South Fork, most of the North Fork, and their confluence are in the Chequamegon National Forest. Both tend to be slow streams often bordered by sedge meadows and alder-willow thickets. A dam on the Yellow River forms the Chequamegon Waters Flowage, the largest water body in the county (Figs. 18 & 19). Below the impoundment the river often flows swiftly over a boulder-strewn bed. Rock outcrops, including some Cambrian sandstones, are fairly common below Gilman. The length of the Yellow River within the county is nearly 24 miles (38.6 km).

Jump River

Another tributary of the Chippewa, the Jump River flows southwesterly out of Price County and cuts across the northwestern corner of Taylor. Farther east, its south fork just barely enters the county for about a mile in the Chequamegon National Forest. For much of its 13 mile (21 km) length within the county, high banks restrict the Jump to a relatively narrow floodplain. The river bed contains abundant boulders and, in places, the lower banks are topped with a peculiar rock "pavement" consisting of boulders and cobbles oriented with their flat sides up (Fig. 14), perhaps the result of periodic ice-scouring. The sandy soil between the rocks supports a prairie-like flora unique in the county (Fig. 15). Precambrian rocks crop out at several points along the river. Together, the Jump and Yellow Rivers drain approximately the northwestern half of the county. The Jump, in its present form, may in fact be partly a product of early logging: according to Spiels (1977), bank erosion caused by extensive log drives in the late

FIGURE 13. Rich floodplain forest along a backwater of the Black River.

1800's widened and shallowed the river. The surveyor's notes from the original General Land Office survey appear to support his claim.

Silver Creek drains the Westboro area and, along with the nearby Mondeaux River, has fairly extensive bottomland forests associated with its lower reaches. Both streams join the South Fork of the Jump River just north of the county line, in Price County.

Rib River

This tributary of the Wisconsin River originates at the outlet of Rib Lake and flows southeasterly before exiting the county near Goodrich. Most of the 18.3 mile (29.5 km) Taylor County segment of this soft water stream is managed for brook and brown trout. Silver maple bottomlands occur in places along its lower end. A large outcrop of Precambrian rock, the "Goodrich Dells," restricts the river to a narrow channel near the Taylor-Lincoln county line (Fig. 5). Roughly the eastern range of townships is drained by the Rib.

Lakes and Flowages

In 1970, Taylor County had 283 lakes and flowages, with a combined surface area of approximately 6,116 acres (2,475 ha). Of these, 83 were soft water and 10 were hard water drainage lakes; 64 were soft water and 9 were hard water seepage lakes; and the remainder were acid bog lakes. The county has no alkaline bog lakes or spring ponds. Bottom materials range from muck to sand and gravel, and, along with pH, water color, and available nutrients, largely deter-

FIGURE 14. Rock "pavement" of cobbles and boulders on lower bank of the Jump River.

mine the kinds and quantity of aquatic vegetation. About 37 percent of lakes have public access.

There are 48 natural lakes in the county larger than 10 acres and over 200 that are smaller. More than half of the smaller lakes, and some of the larger ones, are acid bog lakes. Nearly all lakes are located in the Perkinstown and Wood Lake terminal moraines, frequently occupying ice-block depressions, or kettles (Fig. 16). The largest natural lake (though its water level is controlled by a small dam) is Rib Lake, at 320 acres (129.5 ha) (Fig. 17). Only 9 others are larger than 50 acres, and all are smaller than 100 acres. Lake Thirty-three is the deepest lake, with a maximum depth of 61 feet (18.6 m), followed by Spruce and North Twin Lakes at 60 feet.

Flowages are impoundments of streams that owe at least half their depth to the impounding structure. The largest lakes in the county are of this type, with the 2,730-acre (1,104.8 ha) Chequamegon Waters Flowage (also called the Miller Dam Flowage) accounting for 45 percent of total lake surface area (Figs. 18 & 19). This impoundment of the Yellow River is used extensively for recreation, with a large section at its southern end managed for waterfowl.

Like the Chequamegon Waters, the Mondeaux Flowage is entirely within the Chequamegon National Forest. Created by a dam on the Mondeaux River, this long, narrow flowage apparently occupies a tunnel channel, a trough eroded by meltwater beneath the ice of the Chippewa Lobe (Attig 1993). The prominent esker that parallels the flowage (Fig. 9) was deposited later and also occupies the trough. Several Forest Service campgrounds and other recreational facilities have been developed along the shores of the Mondeaux Flowage.

Other impoundments include the Medford Millpond, Steve Creek Flowage, and several small flowages in the Pershing State Wildlife Area (Fig. 32). All but the former were created and are managed for waterfowl.

FIGURE 15. In places, lower banks of the Jump River support a prairie-like flora unique in the county, including several rare or uncommon species.

FIGURE 16. Duchien Lake, one of numerous small kettle lakes in the marginal zones.

FIGURE 17. Rib Lake, the county's largest natural lake. Looking northwest toward the Village of Rib Lake, with the Perkinstown Moraine in the background.

FIGURE 18. Miller Dam, on the Yellow River, creates the Chequamegon Waters Flowage.

FIGURE 19. Chequamegon Waters Flowage—by far the county's largest water body.

VEGETATION

> It is clear that no one lamented the disappearance of the picturesque forest, since there were altogether too many trees for comfort.
>
> John Bakeless, *The Eyes of Discovery*

Presettlement Times

During the last continental glaciation, called the Wisconsin Glaciation, the Laurentide Ice Sheet reached its maximum extent in north-central Wisconsin, including Taylor County, about 25,000 to 15,000 years B.P. (Figs. 6 & 8). At that time the glacier covered somewhat more than the northwestern half of the county, while the southeastern half, which had been glaciated earlier in the Pleistocene, was likely in permafrost (Attig 1993).

Between 15,000 and 10,000 years B.P., the continental glacier was in retreat, and by 6,000 B.P. had largely collapsed, with remnants still remaining above 60° north latitude (Delcourt & Delcourt 1993). Boreal forest, with white and black spruce (*Picea glauca* and *P. mariana*) at the leading edge, and tamarack (*Larix laricina*), balsam fir (*Abies balsamea*), and boreal hardwoods close behind, colonized behind the retreating ice sheet, but only after the raw glacial till had been made suitable for them by pioneering nitrogen-fixing plants such as *Dryas* and *Alnus* (Sauer 1988).

With the warming of the climate, temperate deciduous hardwoods spread north from refugia south of the ice margin. White pine (*Pinus strobus*) was here by 7,000 B.P., but hemlock (*Tsuga canadensis*) followed more slowly, finally reaching Wisconsin about 5,000 B.P. Shortly after, for reasons that are unclear, the hemlock population collapsed to perhaps ten percent of its former abundance throughout its range in eastern North America, finally recovering by about 3,000

B.P. (Sauer 1988). Hence, the Taylor County forest, as it appeared to the first Europeans, had probably been in place for no more than 3,000 years—hardly an instant in geological time.

Before the arrival of the white man, the land that is now Taylor County was claimed by various groups of Native Americans, probably including the Hurons, Winnebago, Sioux, Ojibwa, and Menominee. However, by all accounts, the Indian population was small, at least in the years immediately preceding white settlement. Perhaps wild rice beds were few or game was scarce in the dense forests that covered virtually the entire county. Whatever the reasons, the Indians considered this to be "starvation country" and generally stayed for only a few days at a time while on their way north or south on one of the trails that crossed the area (Spiels 1977). Evidence of more permanent habitation is sparse: the surveyors' notes of the 1850s mention evidence of Indian camps in a few locations (Latton 1948) and the first white settler in the Jump River area is supposed to have built his log house on the site of a former Indian cornfield along the river (Nagel 1986).

The first white men to visit the area may have been the French voyagers Radisson and Groseilliers; there is some evidence that they trapped on tributaries of the Chippewa River in the seasons of 1656-1658. There are also reports that Father Rene Menard, a Jesuit missionary, died somewhere in the area in 1661 while traveling from the Chippewa to the Wisconsin River (Latton 1948; Reuss et al. 1976).

In the 1850s and early 1860s, the land that would become Taylor County was surveyed under the township and range system by the federal government. The surveyors working for the U.S. General Land Office had specific instructions to note the kind and diameter of all bearing trees (i.e., those blazed and used to relocate section corners) and trees intersected on survey lines. In addition, they recorded distances when entering and leaving streams, swamps, marshes, prairies, groves, and windfalls. A summary paragraph or two was written for each township noting such particulars as the most numerous kinds of trees, value of the timber, dominant undergrowth, general topography, and soil quality. [For further information on the General Land Office survey, including methods used and accuracy of surveyors's notes, see Bourdo (1956) and Finley (1976).]

Because the General Land Office survey preceded white settlement and most logging, the surveyor's notes provide a fairly accurate sketch of this area just prior to a period of major vegetational changes. What the notes make clear is that Taylor County was almost entirely covered by a dense forest dominated by hemlock and yellow birch (*Betula alleghaniensis*), with white pine, sugar maple (*Acer saccharum*) and basswood (*Tilia americana*) as major associates (Fig. 20). This hemlock-hardwood forest was interspersed with numerous swamps of tamarack and, to a lesser extent, white-cedar (*Thuja occidentalis*) and black ash (*Fraxinus nigra*), with black spruce the dominant species in bogs. Hardwoods were often dominant on uplands having better soils. Though white pine was nearly always present, its quantity and quality varied from place to place: the surveyors made note of the "splendid white pine" in more than one township, while in others it was judged to be of "poor quality." Vast areas covered with huge white pines exist largely in the imagination.

According to the surveyors, undergrowth was often a dense mixture of hemlock, balsam fir, and hazel (*Corylus* spp.), but particularly on the southeastern till

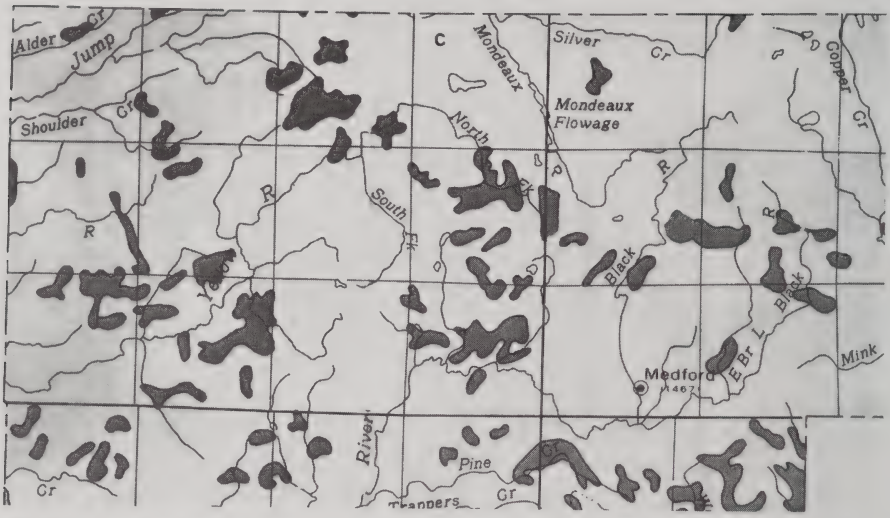

FIGURE 20. Presettlement vegetation of Taylor County from General Land Office surveyor's notes, 1854-1862: gray areas represent hemlock-yellow birch-white pine forest; dark areas are conifer swamps; white area at top-center is a large blowdown grown up to aspen (adapted from Finley 1976).

plain, where drainage was often poor, it was sometimes described as being open and mossy. The landscape was laced with numerous streams, these often sluggish and lined with wet meadows and alder (*Alnus incana*) thickets. Elm (*Ulmus* spp.) was common at the borders of wetlands and in some upland stands. At least two large blowdowns were noted by the surveyors, one of recent origin, the other older and grown up to aspen (*Populus* spp.) and balsam fir. Consistently, in every township and most sections, hemlock and yellow birch were noted as the principal trees. The following examples excerpted from the township summaries are fairly typical (General Land Office 1854–1862):

> T31N, R2W: This township contains numerous small tamarack and cedar swamps. Surface broken. Timber is heavy all over the township, chiefly hemlock, birch, sugar maple and pine. There is a new windfall made last fall in the northern part of the township.

> T33N, R4W: This township contains several swamps, some of considerable extent. The meadow and alder bottoms are good for hay. Heavily timbered with hemlock, yellow birch, balsam and white pine. The undergrowth is generally thick and composed of hemlock, balsam, and hazel. Balsam and elm line the margins of meadows and alder bottoms.

Logging and Settlement

As early as the late 1850s, loggers were pushing up the Black River and tributaries of the Chippewa in search of the white pine which was already becoming scarce farther south (Fig. 21). Arthur Latton, the son of an early settler, described the presettlement forest and the coming of the lumbermen:

FIGURE 21. "Virgin timber" (from Latton 1948, used by permission).

When woodsmen first came to this part of the state, they found two-thirds of the area covered with a dense growth of pine, hemlock, birch, maple, basswood, tamarack, cedar, spruce and other kinds of timber, so thick, that in many places, the sun's rays could not reach the ground. In some places, especially on the north side of a hill, the snow which was often three or four feet deep, would change to ice, and would not melt until late summer.

It was the woodsmen, and not the settlers, who came here first after the white pine which was so plentiful. After the pine had been pretty well cut in Clark County, logging companies, chiefly from La Crosse, sent their crews still farther up the Black Valley to cut the Taylor County pine and float the logs down to their mills, there to be sawed. Still other companies sent their crews up the Yellow, Jump, and Rib river valleys long before there were many settlers here. (Latton 1948)

Another account indicates that the loggers had already reached the Westboro area, in the northern part of the county, before 1860:

By the mid-1850s, the lumbermen were in Wisconsin in force. . . . Devastation lay in their wake. . . . But the pine upstream was whetting their appetites. They pushed up the Wiscon-

FIGURE 22. A load of white pine logs headed for the mill; Rib Lake area, circa 1880 (from Latton 1948, used by permission).

sin, St. Croix, Chippewa and Yellow Rivers and were in the township of Westboro late in the 1850s. (Hill 1975)

In the northwestern part of the county, the white pine was being cut and floated down the Jump River in 1861 (Nagel 1986). In the 1870s, clear pine logs sold for $4.50 per thousand board feet (Fig. 22). At first only the best pine could be sold, but eventually any pine was marketable. Other timber, except for some hardwood firewood, had little or no value. Numerous sources note four foot diameter pines as being common, with five feet and larger not unheard of, though the great majority were probably in the 20- to 30-inch-diameter range, or smaller (Bourdo 1983). When the old court house in Medford was torn down around 1913, it was found that joists of clear pine, 2″ × 12″ and thirty feet long, had been used in its construction (Latton 1948).

In 1872, the first white settler arrived at the site of present-day Medford and shortly after the Wisconsin Central laid its tracks through the area on its way to Ashland. Local men were paid ten cents apiece to cut and hew ties for the new line (Hill 1975). Towns quickly sprang up along its right-of-way, some consisting of only a few buildings with the sole purpose of servicing the wood-burning steam locomotives.

Taylor County was incorporated from parts of adjacent counties in 1875. By 1880, the best of the white pine had been cut and lumbermen turned to other species. Hemlock, extremely abundant [fifteen years later Roth (1898) put the supply in Taylor County as high as two billion board feet] but scorned as lumber

because the wood was splintery and dulled tools faster than pine, finally came into its own—but not as a building material.

Hemlock bark is rich in tannin and when, in the 1880s, eastern financial interests became aware of the area's hemlock forests, tanneries were soon built in Westboro, Rib Lake, Perkinstown, and Medford. Hence, at first the hemlock was cut only for its bark, which was peeled in the woods and hauled to the tanneries, while the logs were left to rot. Latton gives some indication of the quantities used:

> On January 20, 1894 a load of hemlock bark, weighing 21,720 pounds net, was hauled six miles to Perkinstown by a two horse team, and at Rib Lake, a four horse team pulled in one weighing 23,300 pounds net. (Latton 1948)

Hides for tanning were imported from as far away as Argentina and Australia and shipped in by the railroad (Rusch 1997). In the early 1900s cheaper chemical tanning methods were developed and local tanneries closed.

An interesting phenomenon mentioned by some early settlers was the formation of "sink holes" that would sometimes swallow up sections of road or railroad track. One was said to be eighty feet deep! Latton (1948) offered this explanation: "Evidently it was an early lake that became completely covered over with vegetation, and when enough weight was put on it, it broke through."

Early farmers were often dependent on the logging industry for their livelihood, selling food to the camps in summer and themselves spending winters working in the woods. It was not an easy life:

> The pioneers of the eighties found it difficult to make clearings, not only getting rid of stumps and stones, but because of the great difficulty in burning the hemlock and hardwood logs and stumps, chiefly because of the moist condition of everything. At first these logs would have to be piled high in order to get them dry enough to burn. There was no market then for hemlock logs, and these had to be burned to have any sort of clearing. (Latton 1948)

The white pine stumps, some reportedly as large as six feet in diameter and with huge roots extending twenty feet in all directions, were especially troublesome. Dynamite was used to get them out.

Though Roth (1898) wrote that, due to the damp nature of its mixed forest, Taylor County suffered little from fires, others report devastating forest fires. In 1894 a fire burned from the Town of Holway, in the southern part of the county, to Rib Lake in the north: "The air was so full of burning embers, that often new fires were started a mile or two farther on, by the wind, and many close calls were reported by people who barely escaped being trapped" (Latton 1948).

Another fire, spreading from the north, burned the north-central part of the county around 1895 (Spiels 1977). Today, the evidence of past fires, in the form of scorched stumps and bits of charcoal near the soil surface, is still apparent in many places in the Chequamegon National Forest and elsewhere in the county.

The logging and subsequent fires worked a drastic change in many areas. Roy Spiels described the landscape near Steve Creek in the northern part of the present day Chequamegon National Forest:

> The folks homesteaded here in 1900, and the growth was all scrub. They could look over the top of it. The original homestead was on a knoll and from there you could see deer run any-

> where from that point into a small grove of hardwood timber that remained near the Steve Creek Flowage to the north, more than a mile away. It was that open. (Spiels 1977)

White pine logs and hemlock bark may have been the most profitable products of the forest, but they were not the only ones. "The first settlers made use of the cranberries and blueberries that were abundant in the swamps. Later raspberries were found in the slashing and still later blackberries came in" (Latton 1948).

Native Americans increased in number in the 1890s when mixed bands comprised of members from various tribes came to the county from Kansas and elsewhere. Many were Potawatomi who some years earlier had been relocated from their Wisconsin homelands to a reservation on the treeless Kansas plains (Oerichbauer, ed. 1981). Campsites or villages were established at Diamond Lake, at a hill site northwest of Perkinstown, and, especially, at a place called Indians Farms (Fig. 23) on the North Fork of the Yellow River in the Town of Westboro (Ruesch 1974; Spiels 1977). Indian Farms was situated at the junction of two main trails and archaeological evidence indicates that the site was also used in prehistoric times (Oerichbauer, ed. 1981).

The landless "stray bands" of Indians who inhabited these places, mainly Potawatomi and Chippewa, would hunt, garden, gather cranberries and blueberries, make maple sugar, and dig ginseng in the Perkinstown area. The ginseng was apparently sold to whites who would then resell it. After the big forest fires, the Indians continued to burn the woods around the Indian Farms, much to the displeasure of the lumber companies, until stopped by the local warden.

The Indian Farms residents included some who were practitioners of the Dream Dance religion, a movement which aimed to "infuse new life and meaning into traditional ideology in the wake of cultural crisis" (Oerichbauer, ed. 1981). Disaster struck when, around the turn of the century, a smallpox epidemic decimated their numbers. According to Roy Spiels (1977), some of the bodies were placed in rough boxes and "buried" in "limby" white pines along the Yellow River. The Indian Farms survivors disbanded in 1908, some moving to the camp at Diamond Lake.

Though it can be only conjecture, Native Americans may be responsible for the intentional or accidental introduction of some plant species to certain locations within the county. For example, *Ambrosia psilostachya*, *Artemisia ludoviciana*, and *Physalis virginiana* are all common at the Indian Farms site, but uncommon or absent elsewhere; *Acorus calamus* is documented only from Diamond Lake, a known Indian campsite, and one other place in the county; and *Apios americana* is known only from along the Jump River, near a site mentioned by Nagel (1986) as a former Indian cornfield. The latter two species are reported to have been cultivated by Native Americans (Curtis 1959). Other possible introductions include *Prunus nigra* and *Helianthus tuberosus*.

By about 1910, the logging of hemlock and other species had surpassed white pine. Around this time, a factory in Medford, employing as many as 100 men, produced veneer and fruit boxes from yellow birch, at least until the timber supply ran out. Then it moved north, out of the county (Latton 1948). The timber, which was once so abundant as to seem nearly inexhaustible, was becoming more expensive—so much so that Medford replaced its wooden sidewalks with concrete.

FIGURE 23. Indian Farms as it looks today. The site is in the Chequamegon National Forest, though mostly on private land.

The 1930s saw the establishment of the Chequamegon National Forest and reforestation efforts. The Civilian Conservation Corps planted many of the red pine so common in the Chequamegon today. On land not converted to agriculture, second-growth replaced the original forest: aspen on the most severely disturbed sites, hardwoods, sometimes in mixture with hemlock and white pine, elsewhere. Though nearly 60 percent of the land area remains forested, in only a few places does the forest hint at the Taylor County of 1860. For a detailed history of the Great Lakes forest, see Flader (1983)

Plant Communities/Habitats

Taylor County is within a sub-region of the eastern deciduous forest formation variously called the hemlock-white pine-northern hardwoods region (Braun 1950), the northern hardwoods association or province (Curtis 1959, and others), the Superior mixed forest, or, simply, the transitional forest (i.e., transitional to the boreal forest of the north). It is entirely north of the Wisconsin tension zone, a band running roughly southeast to northwest through the state in which many northern and southern species reach their range limits (Curtis 1959). The vegetation of our area can be further sub-divided into plant communities, a rather imprecise concept indicating a group of species often found growing together and interacting in a particular environment. The history of a specific site and environmental factors such as moisture, soil, aspect, and disturbance generally determines the plant community found there. Communities commonly intergrade and individual species can be, and often are, members of more than one community. Perhaps no two sites are exactly alike in species composition, though the differences may be subtle.

The plant communities of Wisconsin have been described in detail by Curtis (1959), Epstein (1991), and others. Those briefly discussed here are based mostly on my own observations in Taylor County and might be better termed plant habitats. The main purpose is to help clarify the habitat terms mentioned in the species checklist that follows; as Voss (1972) wrote in *Michigan Flora*, the idea is to give an *impression* of the kinds of places where a particular species grows.

In the checklist, the terms forest and woods are used interchangeably, as are deciduous and hardwood, except "hardwood" does not include aspen forests (*Populus tremuloides* and *P. grandidentata*). A mixed forest is one having significant proportions of both deciduous and coniferous species.

Upland forests are those not subject to flooding and are either dry-mesic or mesic. Taylor County lacks extensive areas of dry sandy soils, thus has no truly dry forests. Hence, the term "dry" is often qualified as "rather dry" or "dryish." In any case, what is meant, in Curtis' (1959) classification, is dry-mesic. Dominant species are usually any combination of paper birch (*Betula papyrifera*), balsam fir (*Abies balsamea*), red maple (*Acer rubrum*), white pine (*Pinus strobus*), red oak (*Quercus rubra*), aspen, and, occasionally, red pine (*Pinus resinosa*) or white spruce (*Picea glauca*). Dry-mesic forests are found on eskers and well-drained, gravelly glacial features associated with end moraines (Fig. 24).

Most of our forests are moist or mesic, that is, neither wet nor dry. In presettlement times, most of Taylor County was covered with a dense mesic hemlock-hardwood forest, usually with a white pine component (Fig. 25). Hemlock-hardwood forests are still fairly common, especially in the Chequamegon National Forest, but older, high quality stands are not. Though hemlock (*Tsuga canadensis*) occurs in pure stands, it is more commonly associated with yellow birch (*Betula alleghaniensis*), sugar maple (*Acer saccharum*), or other hardwoods. Most mesic forests today are hardwood forests (Fig. 26), usually dominated by sugar maple, with basswood (*Tilia americana*), white ash (*Fraxinus americana*), yellow birch, and red oak as common associates. Ironwood (*Ostrya virginiana*) is usually present in the understory, and rich sites often have bitternut hickory (*Carya cordiformis*) and the occasional butternut (*Juglans cinerea*). Green ash (*Fraxinus pennsylvanica*) is a minor associate in some stands.

The adjective damp, used to describe several different habitats, simply means somewhere between wet and moist [i.e., wet-mesic, but not in the sense of Curtis' (1959) northern wet-mesic forest]. Damp woods are widespread at wetland margins and on flat, poorly drained ground moraine and may support a mix of upland and lowland species. Sites with medium fertility are often dominated by hemlock, in mixture with yellow birch or red maple, while hardwoods, including sugar maple, occur on richer sites. However, aspen and red maple probably dominate the majority of these sites, at least on private lands, because of logging practices. American elm (*Ulmus americana*) was formerly common on these and wetter sites.

Though the differences are not always clear-cut, lowland forests can be divided into nutrient-rich forests on mineral soil, dominated by black ash (*Fraxinus nigra*) or white-cedar (*Thuja occidentalis*), and nutrient-poor bog forests dominated by black spruce (*Picea mariana*) and tamarack (*Larix laricina*).

A swamp is a forested wetland. Black ash and white-cedar both occur in

FIGURE 24. Dry-mesic woods on end moraine: paper birch, red pine, fir, and aspen, with bracken (*Pteridium aquilinum*) abundant in the ground layer.

nearly pure stands, with black ash swamps (Fig. 27) more common than cedar swamps. Often the two species are codominant, with red maple and balsam fir as common associates. These habitats are usually on nearly flat terrain, sometimes along low gradient streams, where nutrient-rich water moves slowly over or just beneath the ground surface.

The high light and nutrient levels in black ash swamps and mixed black ash-cedar swamps often result in dense, diverse shrub and ground layers. Common woody understory species include mountain maple (*Acer spicatum*), speckled alder (*Alnus incana*), winterberry (*Ilex verticillata*), red-osier dogwood (*Cornus stolonifera*), and wild currants and gooseberries (*Ribes* spp.). Canada yew (*Taxus canadensis*) was probably common in the past, but is now scarce, due primarily to deer browsing.

Mature cedar swamps are usually dark, cool, mossy places with rather open understories. Bryophyte diversity is high, but relatively few herbs thrive in the shady conditions. Good examples of this habitat are uncommon in the county, occurring mainly in the Chequamegon National Forest.

Cedar and black ash also occur in mixed swamps with various combinations of yellow birch, hemlock, white pine, paper birch, and occasionally white spruce, as well as red maple and balsam fir. Aspen currently dominates many wet sites where management practices have maintained it.

Most tamarack swamps (Fig. 28) are found on wet, acid, nutrient-poor sites, sometimes on mineral soil, but more often on peaty substrates that can be extensive in filled lakebeds. The surface is usually covered with *Sphagnum* mosses in which grow sedges and ericaceous plants such as Labrador-tea (*Ledum groen-*

FIGURE 25. Mesic hemlock-hardwood-white pine forest on ground moraine: "Gerstberger Pines," near Rib Lake.

landicum) and blueberries and cranberries (*Vaccinium* spp.). Tamarack is commonly associated with black spruce in bog forests and muskegs, though black spruce can occur alone. In general, tamarack is more common on bog mats and other sites with water at or near the surface, while black spruce prefers a firm peat substrate. Both species sometimes invade adjacent uplands. Tamarack-black spruce swamps and bogs are fairly common on both ground and end moraine topographies. Kidrick Swamp is part of an extensive complex of swamps, bog forests, and muskeg on ground moraine in the northwestern part of the Chequamegon National Forest.

Occasionally, tamarack occurs with white-cedar on nutrient-rich sites, sometimes called "treed fens" (Crum 1988). High understory and ground layer diversity is a characteristic of these mixed stands, which are apparently restricted to only a few places on outwash ahead of the Perkinstown Moraine.

FIGURE 26. Rich mesic hardwood forest on an ice-walled-lake plain near Perkinstown, Chequamegon National Forest.

A bog is a peatland dominated by *Sphagnum* mosses and ericaceous shrubs such as leatherleaf (*Chamaedaphme calyculata*), Labrador-tea, bog-rosemary (*Andromeda glaucophylla*), bog-laurel (*Kalmia polifolia*), and *Vaccinium* spp., sedges (*Carex* and *Eriophorum* spp.) and, eventually, by tamarack and black spruce (Fig. 29). A bog mat is that portion of a bog encroaching on open water and not yet grounded (Fig. 30). Bogs and bog processes are described in great detail by Crum (1988).

Periodically flooded woodlands along streams are called bottomland forests, floodplain forests, or riverbottom forests; all mean the same thing (Figs. 13 & 31). Generally dominated by silver maple (*Acer saccharinum*), with bur oak (*Quercus macrocarpa*) and green ash as common associates, this nutrient-rich habitat offers one of the best displays of spring-flowering woodland wildflowers. It also has the greatest concentration of vines, including moonseed (*Menispermum canadense*), wild yam (*Dioscorea villosa*), river-bank grape (*Vitis riparia*), wild cucumber (*Echinocystis lobata*), and carrion-flower (*Smilax lasioneura*). Bottomland forests are most extensive along the Black River, though all of our larger streams have at least some.

A dense growth of shrubs or small trees is termed a thicket. Wet thickets are often a combination of alder and willow (*Salix* spp.), or mountain holly (*Nemopanthus mucronatus*) and winterberry, and occur at stream, bog, and swamp margins. In a few places on poorly-drained ground moraine, alder and willow thickets cover many acres. Various species of dogwood (*Cornus* spp.) sometimes form upland thickets, as do wild plums and cherries (*Prunus* spp.), while hazel (*Corylus* spp.) is often dense in forest openings and on riverbanks.

FIGURE 27. Black ash swamps are common and often support a great diversity of shrubs and herbaceous plants. This one has a sedgy groundlayer, perhaps due to past disturbance.

Though fairly self-explanatory, lakes and streams do vary considerably in water chemistry and color, depth, swiftness or lack of current, and substrate materials. All are important factors determining kinds and quantities of aquatic plants.

A marsh is a treeless wetland generally dominated by cattails, sedges, and grasses, usually interspersed with open water at least part of the year. In Taylor County, natural marshes are usually small and found along streams or in areas flooded by beavers. Impoundments have created fairly extensive marshes at the Pershing State Wildlife Area (Fig. 32) and at the Steve Creek, Chequamegon Waters, and Mondeaux Flowages.

Meadows are damp or seasonally wet open areas dominated by sedges or grasses, often with scattered shrubs. They commonly occur along streams where

FIGURE 28. Tamarack swamps are widespread on both ground and end moraine topographies. Black spruce is a common associate.

FIGURE 29. Sphagnum bog north of Jerry Lake, Chequamegon National Forest. Tamarack and black spruce are invading; cotton grass (*Eriophorum* sp.), *Carex* spp. and ericaceous shrubs dominate the groundlayer.

FIGURE 30. A floating bog mat surrounds this small bog lake, one of three in the Wood Creek Headwaters Bog, Taylor County Forest.

FIGURE 31. Silver maple-dominated bottomlands along the Black River.

periodic flooding caused by beaver activity kills trees or prevents them from becoming established (beaver meadows) (Fig. 33), or in other low-lying areas where some form of disturbance has prevented tree growth. Old fields are different in that they are formerly cultivated or pastured land, usually on somewhat higher ground, and generally covered with non-native grasses and a mix of non-native and native herbaceous species, especially goldenrods (*Solidago* spp.).

Some reference is made to prairies, mainly in connection with railroad right-of-ways. Though Taylor County likely had few or no prairies prior to white settlement, small communities of prairie species have since sprung up in several places along railroad tracks, particularly where the right-of-ways cross the Perkinstown Moraine and grading has exposed gravelly subsoils. The manner in which some species found their way to these sites can only be guessed at. An interesting prairie-like vegetation also occurs in places along the Jump River where periodic flooding and ice scouring maintains open habitats (Fig. 15).

Rock outcrops are exposures of Precambrian (Fig. 4) or, rarely, Cambrian (sandstone) bedrock. While not a very important habitat, occurring only along our major streams, a few plant species are nearly or entirely restricted to them.

Because they are convenient places to see and collect plants and, collectively, cover many acres, roadsides (Fig. 34) and railroad right-of-ways (Fig. 35) are mentioned frequently in the checklist. They can be wet or dry, open or wooded—about the only thing they have in common is that most see periodic disturbance in the form of mowing or cutting. On the other hand, the gravel road shoulders of paved roads, composed of crushed glacial gravel or, occasionally, "rotten" granite, are all basically alike and comprise a rather distinctive, highly disturbed habitat that a number of plant species seem to specialize in colonizing.

Gravel pits (Fig. 36) are widespread and often provide a suitable environment

FIGURE 32. Extensive marsh habitat has been created at the Pershing State Wildlife Area.

FIGURE 33. Sedge meadows often occur along low-gradient streams, in areas periodically flooded by beavers. Sailor Creek, in the Chequamegon National Forest, is pictured.

for species that prefer dry open sandy places, a habitat that is otherwise lacking in the county. Aquatic species likewise find new habitat in gravel pit ponds.

Other highly disturbed habitats include gardens and fields, lawns, and "waste places" such as vacant lots, areas around factories and feed mills, and neglected places near habitations. All have their plant specialists—the ones we normally call "weeds."

Forest Habitat Types

Forest habitat typing is a system for classifying forest communities and the sites on which they develop according to their potential climax plant communities (i.e., the ultimate product of succession). Groups of understory indicator species are used to identify a particular habitat type at any successional stage. Habitat types are named for the tree species that tend to dominate a particular community and for characteristic understory species. For example, a common habitat type in Taylor County is ATM, which stands for *Acer saccharum* (sugar maple)—*Tsuga canadensis* (hemlock) / *Maianthemum canadense* (Canada mayflower).

Though still evolving, the system has been widely adopted by silviculturalists and forest ecologists and is proving to be very useful, allowing for much finer discrimination between forest types than previous systems. The forest habitat type concept is explained in detail in Kotar et al. (1988) and Kotar & Burger (1996). The earlier work includes descriptions of Taylor County habitat types and keys for identifying them. Thus far, only upland forests have been typed.

FIGURE 34. Roadsides cover many acres and are convenient places to collect plants.

Kovach (forthcoming) listed and described eight well-defined habitat types for Taylor County, and one or two that have yet to be fully characterized. Two of these, AQV (*Acer rubrum—Quercus rubra / Vaccinium angustifolia*) and PMV (*Pinus strobus / Maianthemum canadense—Vaccinium angustifolium*) are dry or

FIGURE 35. Many interesting plants, including prairie species, occur along railroads.

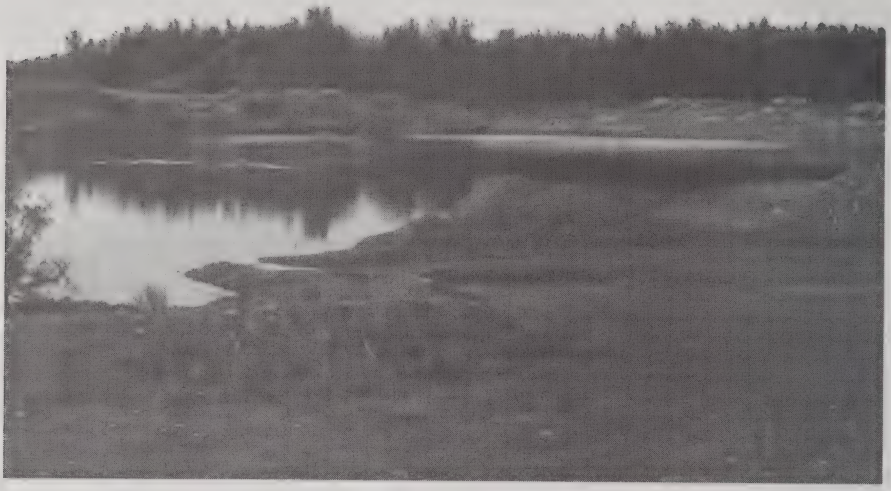

FIGURE 36. Gravel mining destroys habitat for some species while creating it for others.

dry-mesic types rarely found within the county, hence, they will not be treated further here. Brief descriptions of the more common types follow:

AVVib (Acer saccharum / Vaccinium angustifolium—Viburnum acerifolium)

A dry-mesic, medium nutrient type. The expected climax overstory trees are sugar maple, red maple, and red oak, though sugar maple is of poor quality compared to richer, more mesic habitat types. Most sites currently support various combinations of aspen, paper birch, red oak, red maple, sugar maple, and white pine. Occurring only occasionally within the end moraine (marginal zone) complex, this is the dryest habitat type one is likely to encounter in Taylor County.

ATM (Acer saccharum—Tsuga canadensis / Maianthemum canadense)

A dry-mesic to mesic and medium nutrient type with a presumed climax overstory of sugar maple, hemlock, and yellow birch. Currently, most sites are dominated by various mixtures of sugar maple, red maple, aspen, paper birch, basswood, red oak, yellow birch, white pine, hemlock, and balsam fir. Perhaps the commonest type within the end moraine complex; occasional on ground moraine.

AViO (Acer saccharum / Viola pubescens—Osmorhiza claytonii)

Mesic, nutrient rich to very rich, with the climax overstory probably sugar maple. Most stands are currently dominated by sugar maple and basswood, or occasionally aspen, with hemlock, red maple, white ash, yellow birch, and ironwood as common associates. Common within the end moraine complex and on the northwestern till plain (ground moraine).

AH (Acer saccharum / Hydrophyllum virginianum)

Mesic, nutrient rich to very rich, with sugar maple the presumed climax overstory tree. Currently sugar maple and basswood (occasionally aspen) dominate most sites. Compared to the AViO type, AH generally supports a higher diversity of hardwood species, including red oak, white ash, red maple, bitternut hickory, yellow birch, butternut, and ironwood, as well as hemlock and white pine. Very common, especially on ground moraine and on ice-walled-lake plains within the marginal zone.

TMC (Tsuga canadensis / Maianthemum canadense—Coptis groenlandica)

Wet-mesic and nutrient medium to poor. The expected climax overstory is hemlock, yellow birch, red maple, and sugar maple. Most sites are currently in combinations of red maple, hemlock, white pine, paper birch, balsam fir, sugar maple, white spruce, and yellow birch. Tree growth is limited by the damp soil conditions. A common type, especially within the end moraine complex, often occurring as a narrow transitional zone between upland forests and wetlands.

HM (hydromesic undefined)

This represents one or two as yet undefined habitat types that occur on wet-mesic, nutrient medium to rich sites. Mostly dominated by aspen and red maple, with sugar maple, balsam fir, basswood, black ash, white ash, green ash, paper birch, and yellow birch as common associates. Very common on ground moraine.

CONSERVATION

> As for diversity, what remains of our native flora and fauna remains only because agriculture has not got around to destroying it.
>
> Aldo Leopold, *The Round River*

> . . . every scrap of biological diversity is priceless, to be learned and cherished, and never to be surrendered without a struggle.
>
> E. O. Wilson, *The Diversity of Life*

Although early logging, followed by settlement and agriculture, profoundly altered our landscape and flora, current forces have the potential to transform it to an even greater extent. Climate change, the proliferation of exotic species, a deer population that sometimes seems out of control, and continued land clearing and logging make it difficult for one to be optimistic about the future of native plant communities. All are largely driven by human-related factors, especially a population that continues to increase both in number and affluence.

In the relatively short time it took to complete the present survey, a 30-acre tract, the finest and one of the last examples of Taylor County's presettlement forest, was logged, the best remaining stand of mature bottomland forest along the Black River was seriously degraded by cutting, and a remarkable assemblage

of prairie species—by far the largest and most diverse railroad prairie in the county—was completely destroyed and replaced with rank weeds after the railroad company sprayed herbicides.

Though these highly visible examples (at least to a botanist) represent major losses of natural diversity for the county, perhaps even more damaging is the cumulative effect of many smaller and much less noticeable everyday losses. The new home in the woods, the drained wetland, the lakeshore development, and the clear-cutting and other harsh logging methods too often employed in forests and woodlots—each contributes to the demise of our native flora.

This ongoing fragmentation of the landscape sets in motion other forces that inflict yet more damage. For instance, with the increase in edge habitat, the white-tailed deer population expands, and deer browsing results in the reduction or elimination of numerous plant species. In Taylor County, as in much of northern Wisconsin, hemlock reproduction is often limited, white-cedar regeneration is rare, and Canada yew has been nearly extirpated because of deer browsing. Herbaceous plants also suffer, particularly species in the orchid and lily families. Some of our rarest and most beautiful wildflowers are particularly vulnerable (Alverson et al. 1988; Balgooyen & Waller 1995).

Recently, ecologists have become aware of another threat to our forests: exotic earthworms. The Great Lakes states are thought to have lost all native earthworms during the last glaciation. European earthworms have been introduced intentionally and accidentally and have spread rapidly in forests via soil on machinery and all-terrain vehicles and by the release of unwanted fishing bait (Conover 2000).

Following the introduction of earthworms, the upper organic soil layers in northern forests can disappear within a very short time (Langmaid 1963), directly threatening the survival of many hardwood forest understory species (Hale et al. 2002; Conover 2000) and creating conditions which allow the rapid spread of early successional species and fast-growing exotics (Sauer 1998). For instance, Gundale (2002) found that populations of the rare fern *Botrychium mormo* often disappeared after the loss of the upper soil horizons due to the introduction of the earthworm *Lumbricus rubellus*. It appears that roads, even small utility roads, are important starting places for invasions of earthworms. Remote forest areas still lack earthworms but their spread seems inevitable.

Continual disturbance of the landscape helps create conditions that allow introduced species to take hold and flourish. Non-native species now comprise more than twenty percent of Taylor County's flora, and this figure is likely to increase. How many of us realize that many or most of the familiar plants growing in our towns and along our roadsides were unknown in North America prior to European settlement?

While most exotic species remain restricted to roadsides, farm fields, and other highly disturbed places, a few are very successful invaders of relatively intact natural communities. Some of these "super-weeds," such as garlic mustard (*Alliaria petiolata*) and European marsh thistle (*Cirsium palustre*), are relative newcomers to the county. Others, notably purple loosestrife (*Lythrum salicaria*), in wetlands, and glossy buckthorn (*Rhamnus frangula*), in woodlands and wetlands, are well-established and constitute an increasing threat to native plant communities.

This is not to say that no efforts are being made to conserve and protect natural areas and native plants in Taylor County. In 2002 the Wisconsin DNR purchased 256 acres of woods, wetlands, and old pasture bordering Diamond Lake, an undeveloped kettle lake near Lublin, and designated it a state natural area. And the Forest Service recently completed a survey which identified the best and oldest forest stands and other natural communities remaining in the Chequamegon-Nicolet National Forest. Logging in most of these areas, which range in size up to a couple thousand acres, has been temporarily suspended pending the completion of a new forest plan in 2004. Some will undoubtedly be set aside as natural areas. But management in others might be modified only slightly or not at all from present forestry practices, which include extensive clear-cutting (Fig. 37).

One natural area likely to be preserved is a forested ice-walled-lake plain in the Chequamegon National Forest near Perkinstown (Fig. 26), possibly the best remaining comparatively undisturbed example of this distinctive glacial feature in the county. Ongoing logging of the site was halted after field surveys found that it contained at least seven rare plant species. Though Taylor County is uncommonly rich in ice-walled-lake plains, the majority have long been cleared for agriculture, while most of those still forested have been seriously degraded by logging, some quite recently.

For its part, the county government recently purchased an isolated 20-acre remnant of what is probably original hemlock-hardwood forest (Fig. 38). Called "Gerstberger Pines," the tract, near Rib Lake, is to be preserved as a "special use area" (*Star News* 1993). No natural areas have yet been set aside in the county forest, though good candidate sites do exist. The latest forest management plan, while offering nothing concrete, at least mentioned the conservation of biological diversity as being a worthy goal.

These developments, though encouraging, do not go nearly far enough to stem the loss of biodiversity in the county. Unlike many Wisconsin counties, Taylor County is blessed with a large amount of publicly owned land. Particularly in the Chequamegon, the opportunity exists to set aside large blocks of land in which logging and other disturbances would be minimal or absent. Large blocks are essential to minimize the edge habitat that promotes large deer populations. In addition, many other techniques and options for preserving and enhancing biodiversity are available to public land managers. However, at times the public may need to insist that they be employed and that natural diversity and native species be accorded an importance at least equal to that of logging and other forms of resource exploitation.

It is true that Taylor County residents alone can do little about global problems like ozone depletion and climate change, but there is much that the individual can do locally to help conserve our natural heritage. Planting native rather than exotic trees and shrubs, allowing fencerows to grow wild, reducing lawn areas and mowed shorelines, keeping cattle out of natural woodlands, careful use of herbicides, and simply becoming aware of our native botanical riches—such things would go a long way toward preserving and bringing back the plants and natural communities that truly belong here.

FIGURE 37. A clear-cut on the Chequamegon National Forest in the Town of Grover, about 5 miles east of Hannibal.

FIGURE 38. "Gerstberger Pines," a 20-acre remnant old growth hemlock-hardwood stand near Rib Lake, mostly surrounded by farm fields. Note the "super-canopy" white pine, characteristic of older forests of this type.

PREVIOUS BOTANICAL RESEARCH

Compared to many counties in the southern half of Wisconsin and to adjacent Lincoln County, botanical work in Taylor County prior to the present report has been quite limited. The earliest known herbarium specimen from the county is a single collection made in 1894 by L. S. Cheney, then curator of the University of

Wisconsin Herbarium. However, there is some doubt as to whether his specimen of *Viola canadensis* was collected in Taylor or in an adjacent county, since the label reads only "Goodrich." Goodrich is a very small Taylor County community close to the Lincoln and Marathon county lines.

In May, August and September, 1915, Charles Goessl made a number of collections in the Rib Lake area. Not much is known about Goessl. A Sheboygan native, he worked as a botanical collector for the Milwaukee Public Museum, collecting throughout the state in the summers of 1915–1917 (Neil Luebke, pers. comm.). Interestingly, five species collected by him have not been documented in the county since. These include the native species *Eleocharis intermedia*, *Eriophorum angustifolia*, and *Platanthera obtusata*, and the introduced *Sinapsis alba* and *Potentilla flabelliformis*. In addition, his collections of the hybrid mints *Mentha ×piperita* and *M. ×villosa* remain the only ones from the county.

It would be over thirty years before another collector worked in Taylor County. As a University of Wisconsin graduate student, Orlin Anderson collected in the Rib Lake area in 1947 and 1948. His collections of *Iris virginica*, *Senecio pauperculus*, *Stellaria borealis*, *Spiranthes lacera*, and *Diphasiastrum complanatum ×digitatum* have not been duplicated by others. Anderson also collected *Leucophysalis grandiflora* from "cleared land" near Rib Lake, a rare species not found again in the county until 1997. His masters thesis was a study of an old-growth forest stand north of Rib Lake titled *An Ecological Study of the Climax Vegetation of Taylor County, Wisconsin*.

Martin A. Piehl, of Medford, collected fairly extensively from about 1955 to 1970. His unpublished 1955 paper, filed at the Wisconsin State Herbarium and titled *The Native Woody Plants of Taylor County, Wisconsin*, lists 127 species, most of which were documented with vouchers at WIS. In the introduction to this paper he noted the scarcity of collections from the county and concluded that the lack of main highways and the inaccessibility of the most interesting botanical sites were the main reasons for the "only very sporadic meetings between Taylor County's plants and the collector's press." His specimens of *Rhus glabra* and *Crataegus flabellata* are still the only ones of these species known from the county. Piehl revised his woody plant list around 1970 and distributed copies to a few friends. Unfortunately, it was not available to me at the time of this writing. He currently lives in West Virginia.

From the 1950s to the present, numerous students have made small Taylor County collections. A few, such as William Barnes of Rib Lake, went on to careers in botany, ecology, or natural resources. Professional botanists who have collected here occasionally include Marcus Fay, Robert Freckmann, Hugh Iltis, and James Peck. Especially noteworthy is Peck's 1979 collection of pteridophytes from the Chequamegon National Forest, several of which stand as the only records from the county. Deposited at UWL, MIL, and WIS, these include *Diphasiastrum tristachyum*, *Lycopodiella inundata*, *Equisetum pratense*, and *Botrychium simplex*.

The county was surveyed for high-quality natural areas in the summer of 1981 by Don Quintenz for the Wisconsin Department of Natural Resources. About thirty-three sites were described in this inventory, some judged to be of state significance. Unfortunately, the Medford District was given only a cursory

look during the Chequamegon National Forest rare plant survey of the same year because it was felt the district lacked good-quality habitats for the species of interest. Subsequently, a number of rare species were found in the Chequamegon and elsewhere in the county. Undoubtedly, others remain to be discovered.

INTRODUCTION TO THE ANNOTATED CHECKLIST

> To know the names of the forms of life is one of the keenest of satisfactions . . .
> L. H. Bailey, *How Plants Get Their Names*

> The beginning of wisdom is to call things by their right names.
> Old Chinese saying

Scope of the Checklist

The checklist catalogues all vascular plant species known from Taylor County outside of cultivation and documented with an herbarium specimen that I have seen. Included are a few waifs and non-persistent species judged to be spontaneous (i.e., not intentionally planted). Not included are species known only from plantings, no matter how long persisting, unless they have spread beyond the original planting. Some of these are noted under excluded species, along with species known from published or unpublished reports for which no voucher specimen could be located. Also excluded are a few species known only from discarded plant material (usually in dumps) that are potential escapes but are not known to have spread beyond the original source material. Admittedly, the criteria for inclusion are somewhat subjective: for some they will be excessively broad, while perhaps being too restrictive for others.

Methods

Field work took place in the years 1993–1997, though time spent in the field in 1996 was quite limited. The project resulted in 2981 specimens (including about 100 bryophytes and lichens), all of which were recorded in a computerized database. Collections were made on approximately 245 days; in addition, many field days resulted in no collections. Collections were made in every township. Nearly all public roads were searched by truck at least once (Fig. 39) and all railroad tracks were walked at least once in each direction. Most lakes with public access, and some without, were surveyed to various extents, as were major streams. I attempted to cover as much ground and as many different habitats as possible, but visited some high quality sites repeatedly, inasmuch as these were the richest in native species. Most were on public lands, though a number were private. Even so, large areas of the county remain unvisited by any botanist and, doubtless, numerous species remain undiscovered.

Herbaria searched for Taylor County specimens include those at the Wisconsin State Herbarium, Madison (WIS), the University of Wisconsin-Stevens Point (UWSP), the Milwaukee Public Museum (MIL), the University of Wisconsin-La Crosse (UWL) (pteridophytes only), and the Chequamegon National Forest (noted here as CNF).

Arrangement and Nomenclature

Arrangement of taxa is alphabetical by family, genus, and species within the four major groups: pteridophytes, gymnosperms, dicots, and monocots. Familial circumscriptions and nomenclature follow the Cronquist system used in *Flora of North America North of Mexico* (1993+) and Gleason and Cronquist (1991). Genera and species circumscriptions and nomenclature follow *Flora of North America* (1993+) for groups treated in the six volumes published to date, including pteridophytes, gymnosperms, and numerous angiosperm families.

For all other families, nomenclature and species circumscriptions were decided on a case by case basis using several sources, including Gleason and Cronquist (1991), Kartesz (1994), Voss (1972, 1985, 1996), Swink and Wilhelm (1994), Ownbey and Morley (1991), Case (1987), Ballard (1994), and *Preliminary Reports on the Flora of Wisconsin* (various authors, 1929–1989). Commonly used synonyms are included to facilitate cross referencing among these works and others. Some, but not all, infraspecific taxa are noted. Author abbreviations are based on Mabberley (1997).

Non-native species are listed in italics and their places of origin are given, if known. It is not always easy to determine if a given species is native or introduced; some, such as Kentucky bluegrass (*Poa pratensis*), may be both.

Common Names

The common names given are those for which there appeared to be some agreement among the above sources. In addition, the popular field guides by Newcomb (1977), Peterson and McKenny (1968), and Zimmerman and Courtenay (1972)

FIGURE 39. Botanizing in the Taylor County Forest.

were consulted. Common names newly coined for specific manuals and lists were avoided inasmuch as these are not in actual everyday use. Many species, especially in the family Cyperaceae, lack widely accepted common names.

Relative Abundance

For those species for which I felt reasonably confident in doing so, an estimate of relative abundance is given, using the terms rare, occasional, frequent, fairly common, common, and abundant. In this I have attempted to be conservative; that is, a particular species may well be more common than indicated, but will seldom be less common.

It should be remembered that relative abundances apply only to those habitats listed for the specific species. For example, leatherleaf (*Chamaedaphne calyculata*) is abundant in sphagnum bogs but is rarely if ever found in dry upland forests. A "rare" species will seldom be encountered, even in apparently ideal habitat, and then usually in small numbers, while an "abundant" one will be present and numerous in much or all of the suitable habitat. "Occasional," "frequent," "fairly common," and "common" represent gradations between these two extremes. Species listed as "local" in distribution may be common, but only in a few places or within a very limited habitat. For habitat descriptions, see the earlier section on plant communities.

Voucher Specimens

All species in the checklist but one are documented by at least one voucher specimen; these are listed in italics and parentheses. Specimen numbers not preceded by a name are my own and are deposited at WIS, unless otherwise noted. Specimens collected by others include the collector's name, specimen number, where deposited, and year of collection. For species collected in the present survey, I have listed only my own specimen numbers, except in a few cases (e.g., rare species). Many common species are well represented in herbaria by previous Taylor County collections, but there seemed little to be gained by listing all such vouchers. The number of specimens listed for a species is not necessarily an indication of abundance, since many common species were collected only once, and others less common, such as *Taxus canadensis*, were documented whenever found.

Rare Species

The Wisconsin Department of Natural Resources, Natural Heritage Inventory (2002) has listed species legally designated as endangered or threatened, as well as species of special concern. "Special concern" is an advisory category for species needing more information concerning distribution and abundance but for which a conservation problem is suspected. In the checklist, the designations of all such species are noted, as are the common names assigned to them by the WDNR. As defined by the WDNR, Taylor County has, as far as is known, 26 state-rare vascular plant taxa: 1 endangered: *Botrychium mormo* (Fig.44), 2 threatened: *Platanthera flava* var. *herbiola* (Fig. 42) and *Poa paludigena*, and 23 of special concern: *Arabis missouriensis* var. *deamii*, *Botrychium oneidense* (Fig. 41), *Callitriche hermaphroditica*, *Carex assiniboinensis*, *C. gynocrates*, *C. pallescens* var. *neogaea*, *Ceratophyllum echinatum*, *Clematis occidentalis* (Fig.

40), *Corallorhiza odontorhiza*, *Cypripedium parviflorum* var. *makasin*, *C. reginae*, *Deschampsia cespitosa*, *Diplazium pycnocarpon*, *Epilobium palustre*, *Leucophysalis grandiflora* (Fig. 43), *Malaxis monophyllos* var. *brachypoda*, *Myriophyllum farwellii*, *Phegopteris hexagonoptera*, *Platanthera hookeri*, *P. orbiculata*, *Potamogeton vaseyi*, *Scirpus torreyi*, and *Utricularia geminiscapa*. All but three of these were first recorded in the county in the course of the present survey. In addition, though not actively tracked by the WDNR, data are being collected on *Juglans cinerea*, *Panax quinquefolius*, and *Taxus canadensis*.

New Records

Many, if not most, of the catalogued species are new county records, a reflection of the limited amount of previous collecting done in Taylor County. Two of our species appear to be new state records: *Astragalus cicer* and *Lychnis flos-cuculi*, both introduced.

Additional Records From Adjacent Counties

Following many of the family lists is an abbreviated list of additional records from adjacent counties. This is not meant to be exhaustive and is mainly limited to specimens at WIS. I include them to give the interested reader a more regional sense of the flora and, especially, as a way to indicate species that might occur in Taylor County but have yet to be documented. For instance, if a species is listed from many or all adjacent counties, from habitats also found in Taylor County, then one might reasonably expect to find it here, too. The opposite is also true; thus, species noted from dry sandy places, a common habitat in some adjacent counties, are unlikely to occur here, since Taylor County generally lacks this type of habitat.

Inexpensive Manuals for the Field Botanist

For those who wish to identify wild plants, learn more about them, and perhaps add to our knowledge of the local flora, I recommend Voss' *Michigan Flora* (in three volumes). This highly readable and relatively inexpensive work includes nearly all of the vascular plant species (exclusive of pteridophytes) likely to be found in Taylor County. *Spring Flora of Wisconsin* by Fassett, though older and limited in scope, is still tremendously useful and fits the pocket. Of the popular field guides, *Newcomb's Wildflower Guide* is recommended for its ease of use and completeness (e.g., many shrub species are included).

Statistical Summary

It is customary in a local flora to give a summary of the total number of known species by plant group and origin, as well as the largest families and genera. Because species circumscriptions vary by author and current knowledge, these numbers can also vary. However, they are useful as good estimates. In Taylor County, as in much of our region, the largest families are the Asteraceae (109), Cyperaceae (98), Poaceae (96), Rosaceae (58), and Fabaceae (33). The largest genus, by far, is *Carex* (70), followed by *Polygonum* (17), *Potamogeton* (17), *Aster* (14), and *Salix* (14). A total of 1026 species and 7 named hybrids are known from the county, representing 439 genera and 125 families. Nearly 22%

FIGURE 40. *Botrychium mormo* (photo by Gregory K. Scott)

FIGURE 41. *Botrychium oneidense* (photo by Gregory K. Scott)

FIGURE 42. *Clematis occidentalis* (photo by Roxana Reitz)

of our flora is introduced. The following table summarizes the number of native and introduced species by group.

Plant Group	Native Species	Introduced Species	Totals
Pteridophytes	48	0	48
Gymnosperms	11	1	12
Dicots	469	180	649
Monocots	276	41	317
Totals	804	222	1026

Electronic Copies of This Checklist

The Vascular Plants of Taylor County, Wisconsin is available in electronic form in WordPerfect® format. Please contact the author at: forhaven@dwave.net

FIGURE 43. *Leucophysalis grandiflora* (photo by Roxana Reitz)

ANNOTATED CHECKLIST OF SPECIES

PTERIDOPHYTES

DIVISION LYCOPODIOPHYTA

ISOETACEAE Quillwort Family

Isoetes echinospora Durieu SPINEY-SPORED QUILLWORT. Locally common in shallow water of lakes, especially those with clear water and sandy substrates. Known from Long, Sackett, Saint Clair, Shearer, and Wood Lakes, and to be expected in others. (*1150, 2065, 2746, 2754, 2795*, all with duplicates at *MIL*.)

Additional records from adjacent counties:

Isoetes lacustris L. (*I. macrospora* Durieu). Lincoln, Price: in similar habitats as *I. echinospora*.

FIGURE 44. *Platanthera flava* (photo by Gregory K. Scott)

LYCOPODIACEAE Club-moss Family

Diphasiastrum complanatum (L.) Holub (*Lycopodium complanatum* L.) NORTHERN RUNNING-PINE. Dry to mesic forests; not common. (*2365*)

Diphasiastrum complanatum × digitatum. Known from a "maple-basswood woods" near the Village of Rib Lake. (*Anderson 461 WIS*, 1948.)

Diphasiastrum digitatum (A. Braun) Holub (*Lycopodium digitatum* A. Braun) SOUTHERN GROUND-PINE. Frequent in moist mixed woods and openings. (*346, 719, 2270, 2286, 2304, 2520*)

Diphasiastrum tristachyum (Pursh) Holub (*Lycopodium tristachyum* Pursh) BLUE GROUND-CEDAR. Favors dry conifer forests. Collected by James Peck in a jack pine stand in the CNF. (*Peck 631A UWL*, 1979.)

Huperzia lucidula (Michaux) Trevis. (*Lycopodium lucidulum* Michaux) SHINING CLUB-MOSS. Moist hardwood or mixed forests; fairly common. (*382*)

Lycopodiella inundata (L.) Holub (*Lycopodium inundatum* L.) BOG CLUB- MOSS. This inconspicuous little club-moss should be expected in bogs, shores, and other wet or seasonally wet places. Collected by Peck in a boggy area in the CNF. (*Peck 79-626A UWL*, 1979.)

Lycopodium annotinum L. BRISTLY CLUB-MOSS. Fairly common in low woods. (*472, 720*)

Lycopodium clavatum L. COMMON CLUB-MOSS. Frequent in moist woods and borders. (*750, 826, 2194*)

Lycopodium dendroideum Michaux PRICKLY TREE CLUB-MOSS. In a variety of woods, from dry to swampy; fairly common. (*383, 713, 1991*)

Lycopodium hickeyi Wagner, Beitel & R. C. Moran (*L. obscurum* var. *isophyllum* Hickey) HICKEY'S TREE CLUB-MOSS. Fairly common in rather dry, open woodlands. (*1815, 1818, 2070*)

Lycopodium lagopus (Hartman) Zinserling ONE-CONE CLUB-MOSS. Known from a Town of Westboro gravel pit where several large patches were found spreading from second-growth woods into open, sterile ground. Formerly considered a variety of *L. clavatum*, differing mainly in having solitary strobili (see *Flora of North America*, Vol. 2, 1993). (*2271, 2496*)

Lycopodium obscurum L. FLAT-BRANCHED TREE CLUB-MOSS. Mixed upland woods; locally common. (*2071*)

Excluded species:

Diphasiastrum ×zeilleri (Rouy) Holub (*Lycopodium ×zeilleri* Rouy). A presumably fertile hybrid of *D. complanatum* × *D. tristachyum*. Mapped for Taylor County by Peck (1982), who gives the preferred habitats as sandy fields and jack pine woods. No voucher specimen was located.

Additional records from adjacent counties:

Diphasiastrum ×habereri (House) Holub (*Lycopodium ×habereri*). Lincoln: mixed woods.

SELAGINELLACEAE Spike-moss Family

Excluded species:

Selaginella rupestris (L.) Spring ROCK SPIKE-MOSS. Mapped for Taylor and all surrounding counties by Peck (1982); however, no voucher specimen was found. Its preferred habitats—exposed rock outcrops and open sands—are virtually non-existent in the county.

DIVISION EQUISETOPHYTA

EQUISETACEAE Horsetail Family

Equisetum arvense L. COMMON or FIELD HORSETAIL. Common in a variety of habitats, including roadsides, railroad ballast, river banks, and open woods. (*352, 882, 1232, 1853, 1921, 2701*)

Equisetum fluviatile L. WATER or RIVER HORSETAIL. Swamps, ditches, shallow water of lakes and streams, and other wet places; frequent. (*333, 351, 1129, 1179, 1182, 1639, 2573, 2713*)

Equisetum hyemale L. subsp. affine (Engelm.) Calder & Roy L. Taylor COMMON SCOURING-RUSH. In open wet to fairly dry places, including railroad ballast and embankments, ditches, and old gravel pits; frequent. (*350, 591, 1551*)

Equisetum pratense Ehrh. MEADOW HORSETAIL. Collected by James Peck in a maple-basswood woods in the CNF. Prefers moist woods and shaded slopes. Widespread in the state, though apparently nowhere common. (*Peck 79-625 UWL*, 1979.)

Equisetum scirpoides Michaux DWARF SCOURING-RUSH. Damp springy places at the bases of steep slopes in undisturbed hemlock-hardwood forests; margins of cedar swamps; stream banks in cool, rich woods; occasional. The smallest of our equisetums. (*675, 942, 2205*)

Equisetum sylvaticum L. WOOD HORSETAIL. Fairly common in moist to damp forests. This rather delicate species has been described as "elegant." (*737, 877, 933, 959, 2303, 2645*)

Additional records from adjacent counties:

Equisetum ×ferrissii Clute. A hybrid of *E. hyemale* × *E. laevigatum*. Chippewa: shore of Chippewa River.

DIVISION POLYPODIOPHYTA

ASPLENIACEAE Spleenwort Family

Additional records from adjacent counties:

Asplenium rhizophyllum L. (*Camptosaurus rhizophyllus* (L.) Link). Clark: shaded cliffs.

DENNSTAEDTIACEAE Bracken Family

Pteridium aquilinum (L.) Kuhn var. latiusculum (Desv.) Underw. BRACKEN FERN. Abundant in a variety of mostly dryish habitats, including woods, roadsides, and along railroad tracks. (*371*)

DRYOPTERIDACEAE Wood Fern Family

Athyrium filix-femina (L.) Mertens var. angustum (Willd.) Lawson NORTHERN LADY FERN. Common in moist woods and borders; occasionally in more open and dryer places. (*361*, *364*, *650*, *1446*, *1846*)

Cystopteris bulbifera (L.) Bernh. BULBLET BLADDER FERN. Cool shaded slopes; moist shaded sandstone outcrops along the Yellow River; very local. (*1613*, *3385*)

Cystopteris fragilis (L.) Bernh. FRAGILE FERN. Shaded rock outcrops along major streams; occasional. (*307*, *1157*)

Cystopteris tenuis (Michaux) Desv. (*C. fragilis* var. *mackayi*) MACKAY'S BRITTLE FERN. Occasional on shaded rock outcrops and moist, cool slopes; also known from moist sandy soil in a wooded bottomland along the Black River. (*924*, *1614*, *2464*, *3386*)

Deparia acrostichoides (Sw.) Kato (*Athyrium thelypterioides* (Michaux) Desv.) SILVERY GLADE FERN. Rich moist deciduous woods, often on slopes; rather local. (*400*, *673*, *3442*)

Diplazium pycnocarpon (Sprengel) M. Broun (*Athyrium pycnocarpon* (Sprengel) Tidestrom) GLADE FERN, NARROW-LEAVED SPLEENWORT. Known from a very rich hardwood forest on an ice-walled-lake plain, occurring here with *Deparia acrostichoides* and *Dryopteris goldiana*. The site is a few miles northwest of Perkinstown in the CNF. A Wisconsin special concern species. (*3387*, *3441*)

Dryopteris carthusiana (Villars) H. P. Fuchs (*D. spinulosa* (O. F. Mueller) Watt) SPINULOSE WOOD FERN. Common in moist to swampy woods and among rock outcrops. (*362*, *1317*, *2169*, *2172*, *2195*)

Dryopteris cristata (L.) A. Gray CRESTED WOOD FERN. Wet woods and thickets, sedge meadows; fairly common. (*392*, *2073*)

Dryopteris goldiana (Hook.) A. Gray GOLDIE'S WOOD FERN. Locally in rich upland woods—especially on ice-walled-lake plains—and in mature bottomland forests along the Black River. (*1751*, *2126*, *2171*, *3381*)

Dryopteris intermedia (Muhl.) A. Gray GLANDULAR or EVERGREEN WOOD FERN. Common in a variety of woods, including rich deciduous and hemlock-hardwood forests, and mixed hardwood-conifer swamps. (*411*, *1616*, *2072*, *2196*)

Dryopteris ×uliginosa (A. Br.) Druce. Known from an alder thicket along Camp Eleven Creek in the CNF. A hybrid of *D. cristata* × *D. carthusiana*. (*Peck 942 WIS*, 1979.)

Gymnocarpium dryopteris (L.) Newman OAK FERN. Moist woods, especially on slopes; common. Will persist in dense shade under hemlock and balsam fir where few other plants survive. (*179*, *367*)

Matteuccia struthiopteris (L.) Tod. OSTRICH FERN. Common in alluvial soil along streams, where it often forms dense stands in open places; also occurs in wet thickets and damp places in rich deciduous or mixed woods. (*1750*)

Onoclea sensibilis L. SENSITIVE FERN. Very common in a variety of wet or moist habitats, including low woods (especially black ash-cedar swamps), wet alder thickets, moist meadows and roadsides, and along streams. The fronds are killed at the first hint of frost, hence both its common and botanical names. (*558*).

Excluded species:

Dryopteris marginalis (L.) A. Gray MARGINAL WOOD FERN. Mapped for Taylor and all surrounding counties by Peck (1982), but no voucher specimen could be found. The usual habitat is rocky, often dry, woods.

Additional records from adjacent counties:

Dryopteris × bootii (Tuckerman) Underwood. Lincoln, Price: wet woods.

Dryopteris × triploidea Wherry. Clark, Lincoln, Price: moist mixed woods.

Woodsia ilvensis (L.) R. Br. Clark, Chippewa, Lincoln, Marathon, Rusk: rock outcrops.

OPHIOGLOSSACEAE Adder's-tongue Family

Botrychium dissectum Sprengel DISSECTED GRAPE FERN. Occasional in habitats ranging from dry open grassy places to moist shady woods. Plants vary widely in the degree of leaf dissection and are sometimes separated into two varieties, *obliquum* (Muhl.) Clute and *dissectum*, both known from Taylor County. (*517*, *518*, *757*, *2650*)

Botrychium lanceolatum (Gmelin) Angström subsp. angustisegmentum (Pease & A. H. Moore) R. T. Clausen LANCE-LEAVED GRAPE FERN, TRIANGLE MOONWORT. Maple-basswood forests; occasional to rare. (*3394*)

Botrychium matricariifolium (Döll) A. Braun DAISY-LEAF GRAPE FERN. Frequent, mainly in maple-basswood forests, but also in hemlock-fir woods and brushy upland clearings, where it seems to attain its largest size. In Taylor County it often occurs in proximity to one or more other *Botrychium* species, including *B. virginianum*, *B. dissectum*, *B. lanceolatum*, *B. simplex*, *B. oneidense*, and *B. mormo*. (*1576*, *1911*, *2305*; *Fields & Krause 2405 WIS*)

Botrychium mormo Wagner GOBLIN FERN. This diminutive and elusive moonwort favors medium-aged, rich ATM habitat type, maple-basswood forests, and is nearly always closely associated with basswood [see Kotar et al. (1988) for habitat type descriptions]. Rare; known from four sites in the CNF, two of which were discovered by Forest Service botanists Steven Spickerman and Marjorie Brzeskiewicz. All locations were on end moraine topography. Endangered in Wisconsin. (*3407*, *3409*; *Fields & Spickerman 1575 WIS*; *Brzeskiewicz s.n. CNF*)

Botrychium multifidum (S. Gmelin) Rupr. LEATHERY GRAPE FERN. Locally in habitats as dissimilar as a dry open grassland and the damp ecotone between a woods and a brushy sedge meadow. (*756*, *2643*)

Botrychium oneidense (Gilbert) House BLUNT-LOBED GRAPE FERN. Known from maple-basswood stands northeast of the Mondeaux Flowage and near Perkinstown on an ice-walled-lake plain, both in the CNF. A state special concern species. (*Peck 79-627 MIL*, 1979.)

Botrychium simplex E. Hitchc. DWARF GRAPE FERN, LEAST MOONWORT. "Maple-basswood" woods northeast of the Mondeax Flowage in the CNF, apparently the same location where *B. oneidense* was collected by James Peck. (*Peck 79-629 MIL*, 1979.)

Botrychium virginianum (L.) Sw. RATTLESNAKE FERN. Rich moist deciduous or mixed forests; fairly common in places. Occasional in brushy clearings. (*474*, *2081*)

OSMUNDACEAE Royal Fern Family

Osmunda cinnamomea L. CINNAMON FERN. A large, attractive fern of swamps and bogs; common. (*1134*)

Osmunda claytoniana L. INTERRUPTED FERN. A common species of woods and roadsides. The sterile fronds are very similar in appearance to those of the above species. (*363*)

Osmunda regalis L. var. spectabilis (Willd.) A. Gray ROYAL FERN. Locally common or abundant in black ash-cedar swamps, though sometimes associated with tamarack or hemlock; occasional along streams and at bog edges. (*372*, *2074*, *2431*)

POLYPODIACEAE Polypody Family

Polypodium virginianum L. COMMON POLYPODY. Locally common on rock outcrops along the Black, Yellow, Jump, and Rib Rivers. Occasionally found among exposed tree roots on steep lakeshore banks, on slopes in undisturbed mature hemlock-hardwood forests, and on large mossy glacial erratics. (*306*, *892*, *943*, *2306*, *2728*)

PTERIDACEAE Maidenhair Fern Family

Adiantum pedatum L. NORTHERN MAIDENHAIR FERN. Rich upland deciduous forests; fairly common. (*360*)

THELYPTERIDACEAE Marsh Fern Family

Phegopteris connectilis (Michaux) Watt (*Thelypteris phegopteris* (L.) Slosson) NARROW or LONG BEECH FERN. Frequent to fairly common in moist to rather wet woods and shaded rock outcrops. (*379*, *410*, *1615*)

Phegopteris hexagonoptera (Michaux) Fee (*Thelypteris hexagonoptera* (Michaux) Nieuw.). Known from two sites in the CNF, both very rich hardwood forests on ice-walled-lake plains. The locations are a few miles northwest of Perkinstown and contain several other rare species. A Wisconsin special concern species. (*3388*, *3408*)

Thelypteris palustris Schott var. pubescens (Lawson) Fern. MARSH FERN. Wet open bogs, sedge meadows, marshes; frequent. (*689*, *2307*)

GYMNOSPERMS

DIVISION PINOPHYTA

CUPRESSACEAE Cypress Family

Juniperus communis L. var. depressa (Pursh) Franco COMMON JUNIPER. Locally on gravelly slopes under red pine near Foss Lake. (*3446*)

Thuja occidentalis L. NORTHERN WHITE-CEDAR. Common in swamps; sometimes forming pure stands, but more often in association with black ash or other species. Occasional in moist upland forests. As with Canada yew and eastern hemlock, white-cedar is heavily browsed by deer and young trees are uncommon. (*828*)

Excluded species:

Juniperus virginiana L. RED CEDAR. Probably not occurring naturally in Taylor County, but sometimes planted and may persist for many years. Known from Lincoln and other nearby counties. (*986*)

PINACEAE Pine Family

Abies balsamea (L.) Miller BALSAM FIR. Dry to wet forests, usually in mixture with other species, though sometimes forming dense thickets; abundant. (*816*)

Larix laricina (Du Roi) K. Koch TAMARACK. Abundant in bogs and swamps; occasionally colonizing open upland sites, such as gravelly road banks. (*823*, *1841*)

Picea glauca (Moench) Voss WHITE SPRUCE. Fairly common in upland forests; frequent in mixed conifer swamps. (*752*, *753*)

Picea mariana (Miller) BSP. BLACK SPRUCE. Abundant in bogs and swamps, usually associated with tamarack. Occasionally in uplands bordering bogs. (*2162*)

Pinus banksiana Lamb. JACK PINE. Commonly planted and frequently spreading to dry roadsides and other dry disturbed places. Probably quite rare prior to white settlement because of the lack of suitable habitat (i.e., dry sandy soils). (*927*)

Pinus resinosa Aiton RED PINE. Uncommon as a naturally occurring species on dryer soils; abundant in plantations. (*1148*)

Pinus strobus L. WHITE PINE. Formerly abundant and still common in forests of various types, frequently invading old fields, disturbed areas, and even bogs. (*1237*)

Pinus sylvestris L. SCOTCH or SCOTS PINE. Most individuals of this introduced species have been planted, but Scotch pine does sometimes colonize dry disturbed sites; frequent. (*453*, *1269*)

Tsuga canadensis (L.) Carrière EASTERN HEMLOCK. Moist upland forests, in pure stands or more commonly with yellow birch, sugar maple, and white pine; sometimes in swamps with red maple or balsam fir. Hemlock was a major component of the pre-settlement forest and as such was abundant throughout the county. Today, though still found in some private woodlands, its best hope for survival is in the CNF, where it is remains abundant in places. Hemlock reproduction is often seriously limited by deer browsing. (*825*)

Excluded species:

Picea abies (L.) Karsten NORWAY SPRUCE. Widely planted and long persisting, especially around old farmsteads. It is uncertain whether this introduced species has become locally naturalized here as it has in some other places in the Upper Midwest (see *Flora of North America*, Vol. 2, 1993). (*972*)

TAXACEAE Yew Family

Taxus canadensis Marshall CANADA YEW. Cedar and mixed swamps, rock outcrops, steep wooded slopes, old hemlock-hardwood forests; occasional. Reproducing populations are rare due to intense deer browsing; most of the collections listed here represent only one or a very few severely browsed individuals. (*497*, *718*, *746*, *806*, *889*, *923*, *941*, *1044*, *2098*, *2159*, *2197*, *2292*, *2423*, *2587*)

FLOWERING PLANTS

DIVISION MAGNOLIOPHYTA

Class Magnoliopsida — *Dicots*

ACERACEAE Maple Family

Acer ginnala Maxim. AMUR MAPLE. Though seldom mentioned in floras, this cultivated Asian species definitely escapes. Known from a grassy railroad right-of-way in Gilman. A prodigious seed producer. (*2629*)

Acer negundo L. BOX-ELDER, ASH-LEAVED MAPLE. Occasional along streams. Also commonly planted and escaped near dwellings. (*1160*)

Acer nigrum Michaux f. (*A. saccharum* Marshall ssp. *nigrum* (Michaux f.) Desm. BLACK MAPLE. Rich moist woods. In our area intergrading with *A. saccharum*, such that specimens are often difficult to place in one or the other taxon. Since several Taylor County collections at WIS are labeled *A. nigrum*, I tentatively include it here. A logger I spoke with insisted that in the woods he had no problem telling the difference between the two species. (*Barnes 139*; *Iwen 47*; *Kettleson 29*; *Piehl 157*; *Ruesch 46*; all WIS.)

Acer rubrum L. RED MAPLE. In a variety of woods, from dry uplands to low woods and swamps—where it is most abundant. Also invades old fields. (*1002*)

Acer saccharinum L. SILVER MAPLE. Abundant in bottomland forests along major streams. Commonly planted. (*1063*)

Acer saccharum Marshall SUGAR MAPLE. Rich upland woods; abundant. An important component of the original hemlock-hardwood forest, though nowadays often found in nearly pure stands—especially on public lands—partly as a result of forest management practices. (*1222*, *1539*, *2518*)

Acer spicatum Lam. MOUNTAIN MAPLE. Characteristic of the understories of swamp forests, but also in uplands; fairly common. (*153*)

AMARANTHACEAE Amaranth Family

Amaranthus albus L. TUMBLEWEED. Occasional along railroad tracks. A native tumbleweed. (*1868*, *2639*)

Amaranthus powellii S. Watson. Fairly common as an agricultural weed. Native to the southwestern U.S. and Mexico. (*1718*)

Amaranthus retroflexus L. REDROOT, ROUGH PIGWEED, GREEN AMARANTH. A common weed of roadsides, railroads, fields, and gardens. From tropical America. (*708*, *1645*, *2653*)

Excluded species:

Amaranthus hypochondriachus L. PRINCE'S FEATHER. Grown as an ornamental. Thriving in a garden waste dump near the village of Gilman, but could hardly be considered escaped. (*3414*, *3415*)

Additional records from adjacent counties:

Amaranthus tuberculatus (Moq.) Sauer (*Acnida altissima* (Riddell) Moq.). Lincoln: border of cultivated field.

ANACARDIACEAE Cashew Family

Rhus glabra L. SMOOTH SUMAC. Collected by Martin Piehl from a sand pit just south of the city dump and along Correction Creek, east side of Medford. The site no longer exists. The specimen is from early in the season, before full leaf expansion and flowering, but is apparently this. (*Piehl s.n. WIS*, 1967.)

Rhus ×pulvinata Greene (*R. ×borealis* Greene). The hybrid of *R. typhina* and *R. glabra*, known from a dry roadside near Perkinstown. (*1524*)

Rhus typhina L. STAGHORN SUMAC. Well-drained roadsides and clearings; common, especially on end moraine topography. (*483*)

Toxicodendron rydbergii (Small) Greene (*Toxicodendron radicans* var. *rydbergii* (Small) Erskine; *Rhus radicans* L. var. *rydbergii* (Small) Rehder) POISON-IVY. Damp open woods and thickets, black ash-cedar swamps, among rock outcrops; common in places. Our plants apparently do not produce aerial roots or climb and are separated from *T. radicans* primarily on that basis. (*1453*)

APIACEAE (UMBELLIFERAE) Carrot or Parsley Family

Aegopodium podagraria L. BISHOP'S WEED, GOUTWEED. Cultivated as a groundcover and occasionally spreading into wooded areas. Difficult to eradicate once established. Europe. (*1622*)

Angelica atropurpurea L. GREAT ANGELICA. Damp roadsides, meadows, thickets, and riverbanks; occasional. Ours, with leaves minutely pilose beneath, have been called var. *occidentalis* Fassett. (*526*)

Carum carvi L. CARAWAY. Locally established along roadsides. Europe. (*1099*)

Cicuta bulbifera L. BULBLET-BEARING WATER-HEMLOCK. Lake and stream margins, marshes, wet thickets; frequent. (*1721*, *1825*, *1895*)

Cicuta maculata L. SPOTTED or COMMON WATER-HEMLOCK. Damp roadsides and meadows, black ash swamps, wet thickets; very common. According to Muenscher (1939), this and the above species are among the most violently poisonous plants in the U.S. (*527*, *528*, *1514*, *1574*)

Cryptotaenia canadensis (L.) DC. HONEWORT. Rich moist forests, especially in bottomlands along the Black River; frequent. (*1175*, *1253*, *1404*, *2373*, *2564*)

Daucus carota L. WILD CARROT, QUEEN ANNE'S LACE. Locally along roadsides. Eurasia. (*669*, *2695*)

Heracleum maximum Bartram (*H. lanatum* Michaux) COW-PARSNIP. Moist roadsides, along streams, damp open woods; frequent. (*1220*)

Hydrocotle americana L. WATER-PENNYWORT. Stream and lake margins, sometimes in wet boggy situations, as at the edges of floating bog islands in Chelsea Lake; local. (*2003*, *2811*)

Osmorhiza claytonii (Michaux) C. B. Clarke SWEET CICELY. Characteristic of rich hardwood forests; common. (*1052*)

Osmorhiza longistylis (Torrey) DC. ANISE-ROOT. Rich floodplain forests along the Jump River; not common. (*1159*)

Pastinaca sativa L. WILD PARSNIP. Along railroads and roadsides; common in a few locations. A real pest in southern Wisconsin prairies and roadsides, but just becoming established here. Europe. (*1354*, *1525*, *1712*)

Sanicula gregaria Bickn. CLUSTERED BLACK SNAKEROOT. Rich mesic hardwood forests; frequent to fairly common. (*1127*, *1239*, *2641*, *2649*, *3291*)

Sanicula marilandica L. BLACK SNAKEROOT. Moist to dryish woods and openings; frequent. (*1236*, *1344*)

Sium suave Walter WATER-PARSNIP. Stream margins, shores, marshes, swamps; sometimes in shallow water; frequent. (*1427*, *1595*)

Zizia aurea (L.) Koch GOLDEN ALEXANDERS. Forms patches along roadsides and in meadows; occasional. (*157*, *2312*)

Excluded species:

Anethum graveolens L. DILL. Collected from a yard waste dump near the village of Gilman, but could hardly be considered escaped at that location. Also known as a garden weed in Lincoln County. Eurasia. (*3416*)

Additional records from adjacent counties:

Sanicula trifoliata Bickn. Clark, Lincoln: woods.

Taenidia integerrima (L.) Drude. Lincoln: woods and open areas.

APOCYNACEAE Dogbane Family

Apocynum androsaemifolium L. SPREADING DOGBANE. Roadsides, old fields, open upland woods and edges; abundant. (*320*, *1297*, *1852*)

Apocynum cannabinum L. INDIAN-HEMP. Occasional along moist roadsides. (*1642*)

Apocynum sibiricum Jacq. (*A. cannabinum* L. var. *hypericifolium* A. Gray) CLASPING-LEAVED DOGBANE. Our only collection is from a lightly shaded gravelly roadside bordering an upland deciduous woods near Lake Eleven in the CNF. Included by some recent authors in *A. cannabinum*. (*2702*)

Vinca minor L. PERIWINKLE. Cultivated and occasionally escaping to woods and open places, especially in and near cemeteries (the old Perkinstown Cemetery is a good place to see this species). Europe. (*945*, *3227*)

AQUIFOLIACEAE Holly Family

Ilex verticillata (L.) A. Gray WINTERBERRY. Damp woods and thickets, swamps, stream and bog margins; fairly common. (*344*, *690*, *780*, *2456*)

Nemopanthus mucronatus (L.) Loes. MOUNTAIN HOLLY. Bog margins, wet meadows and thickets, swamps; common. (*451*, *1000*, *2325*, *2415*)

ARALIACEAE Ginseng Family

Aralia hispida Vent. BRISTLY SARSAPARILLA. Dry disturbed gravelly or sandy ground, including clearcuts, gravel pits, and upper shores; occasional. (*393*, *2416*)

Aralia nudicaulis L. WILD SARSAPARILLA. In a wide variety of dry to wet woods; abundant. (*994*, *3250*)

Aralia racemosa L. SPIKENARD. Rich upland woods, black ash-cedar swamps; frequent. One of our largest native herbaceous plants. (*475*, *2080*, *2476*)

Panax quinquefolium L. AMERICAN GINSENG. Rich upland deciduous woods; often on slopes. Though one still hears of "old-timers" collecting wild ginseng for commercial sale, this species is undoubtedly quite scarce in Taylor County—in nearly five years of field work, I have encountered it only a few times. (*2642*, *3389*, *3402*, *3445*)

Panax trifolium L. DWARF GINSENG. Rich, often rather wet, woods; somewhat local, but usually common where found. (*151*, *2235*, *3223*)

ARISTOLOCHIACEAE Birthwort Family

Asarum canadense L. WILD-GINGER. Rich deciduous woods, often on slopes; frequent. The unusual flowers commonly lie under the leaf litter and are pollinated by beetles. (*874*, *3009*)

ASCLEPIADACEAE Milkweed Family

Asclepias exaltata L. POKE MILKWEED. Upland woods, often in small openings; occasional to frequent. (*402*, *2334*, *2486*)

Asclepias incarnata L. SWAMP MILKWEED. Wet meadows, especially along streams; common. (*470*)

Asclepias syriaca L. COMMON MILKWEED. Roadsides, old fields, and other open places; abundant. (*413*, *2201*)

Asclepias verticillata L. WHORLED MILKWEED. Known from one location: a small colony in a dry sandy roadside bank in the CNF. (*2759*)

Excluded species:

Asclepias purpurascens L. PURPLE MILKWEED. Mapped in error for Taylor County in Noamesi and Iltis (1957). Would be far north of its normal Wisconsin range, here. Endangered in Wisconsin.

Asclepias tuberosa L. BUTTERFLY WEED. Rarely cultivated and persisting in dry ground, but apparently not spreading. Known from some adjacent counties.

Additional records from adjacent counties:

Asclepias ovalifolia Decne. Chippewa: sandy open area.

ASTERACEAE (COMPOSITAE) Aster or Composite Family

Achillea millefolium L. YARROW, MILFOIL. Roadsides, old fields, and other open places; abundant. Lavender or pink-flowered forms are occasional. (*287*, *807*, *1719*)

Achillea ptarmica L. SNEEZEWEED. Cultivated and rather frequently escaping to roadsides where it forms patches. The double horticultural form is known as "The Pearl." (*538*)

Ambrosia artemisiifolia L. COMMON RAGWEED. Roadsides, fields, gardens, and other disturbed areas; abundant. (*530*, *2766*)

Ambrosia psilostachya DC. WESTERN RAGWEED. Common in a large, somewhat remote, dry grassy clearing northwest of Lost Lake in the CNF—our only known location. The site was once used as a Native American gathering place. (*755*)

Ambrosia trifida L. GIANT or GREAT RAGWEED. Moist roadsides, farmyards, and other weedy places, often in rich soil; frequent. (*728*)

Anaphalis margaritacea (L.) Benth. & Hook. PEARLY EVERLASTING. Dry road banks, often at the borders of woods; frequent. (*416*, *537*, *1944*)

(Nomenclature and species circumscriptions for the following species of *Antennaria* follow Bayer & Stebbins (1993), the most recent work on this difficult genus.)

Antennaria howellii Greene PUSSY TOES. Two subspecies in our area:

ssp. petaloidea (Fern.) Bayer. Roadsides, railroads, lawns, dry open woods; common. (*879*, *917*, *920*, *1304*)

ssp. neodioica (Greene) Bayer. Collected from a dry open red pine plantation on Gilman School Forest land, where fairly common. (*931*)

Antennaria neglecta Greene PUSSY TOES. Known only from a dry railroad "prairie" where occasional. (*1088*, *1089*)

Antennaria parlinii Fern. PUSSY TOES. Occasional to frequent in dry open woods. Ours are apparently ssp. fallax (Greene) Bayer & Stebbins. (*1102*, *1303*)

Anthemis cotula L. DOG-FENNEL, MAYWEED, STINKING CHAMOMILE. Gravel road shoulders and waste places; locally abundant, especially in the Medford area. Europe. (*730*, *2635*)

Arctium minus Schkuhr COMMON BURDOCK. Old homesites and gardens, farmyards, roadsides and railroads, other weedy places, often in rich soil; frequent. Eurasia. (*1748*)

Artemisia absinthium L. WORMWOOD, ABSINTHIUM. Abundant on a clay bank in an abandoned section of a gravel pit south of Jump River; also collected along the Pine Line recreational trail (a former railroad right-of-way). Eurasia. (*1728*, *2684*)

Artemisia biennis Willd. BIENNIAL WORMWOOD. Occasional in waste places, in rich ground. Native to the northwestern U.S. (*786*, *1954*)

Artemisia ludoviciana Nutt. WHITE SAGE, WESTERN MUGWORT. Locally along railroads, on sandy river banks, and in dry open grasslands. (*759*, *1600*, *1727*, *1903*, *2165*)

Artemisia serrata Nutt. SAW-TOOTHED SAGE. Frequent in moist open areas along the Black and Jump Rivers, generally in rich sandy alluvial soils. (*1915*, *2143*, *2826*, *2830*)

Aster borealis (Torrey & A. Gray) Prov. (*A. junciformis* Rydb.) RUSH ASTER. A depauperate specimen without flowers or fruit at WIS has been determined to be this. It was collected in a "rich tamarack-cedar bog." (*Patman & Christensen s.n. WIS*, 1959.)

Aster ciliolatus Lindley LINDLEY'S ASTER. Roadsides; common in places. (*544*, *656*)

Aster cordifolius L. HEART-LEAVED ASTER. Known from a shady bank of the Black River, south, where one of its associates was *Carex assiniboinensis*. (*2128*)

Aster firmus Nees (*A. lucidulus* (A. Gray) Wieg.; *A. puniceus* L. var. *firmus* (Nees) Torrey & A. Gray). Apparently very localized: we have collections from a moist roadside and a shady bank of the Black River. Most recent authors (not Cronquist) treat it as a variety of *A. puniceus*. (*2160*, *2831*)

Aster lanceolatus Willd. (including *A. simplex* Willd.) PANICLED ASTER. Moist to wet roadsides, railroads, stream margins, and other damp open places; common. We have both the typical variety and var. *simplex* (Willd.) A. G. Jones. (*541*, *542*, *583*, *1862*, *1926*, *1942*, *2153*)

Aster lateriflorus (L.) Britton CALICO or SIDE-FLOWERING ASTER. Woods and borders, roadsides, damp meadows; fairly common. (*672*, *2061*)

Aster macrophyllus L. BIG- or LARGE-LEAVED ASTER. Common in well- drained woods, especially after logging; also at forest margins and on open or partly shaded road and railroad embankments. (*590*, *2828*, *2947*)

Aster novae-angliae L. NEW ENGLAND ASTER. Occasional along moist roadsides. Our occurrences of this showy species may represent escapes from cultivation. (*842*, *2157*)

Aster oolentangiensis Riddell (*A. azureus* Lindl.) SKY-BLUE or AZURE ASTER. Locally common in a few dry prairie-like areas along railroad tracks and roadsides. One of our collections (*617*) has white rays. (*587*, *617*, *619*, *1949*, *2154*)

Aster pilosus Willd. Our one record, from McKinley Township, is without habitat data. (*Kavanagh 11 WIS*, 1971.)

Aster prenanthoides Muhl. ex Willd.. CROOKED-STEM or ZIGZAG ASTER. Black River bottomlands; locally frequent. (*2831*)

Aster puniceus L. PURPLE-STEMMED or BRISTLY ASTER. Swamps, marshes, stream margins, wet meadows and roadsides; fairly common. See also *A. firmus*. (*556*, *635*, *1940*, *1941*, *1995*, *2006*)

Aster sagittifolius Willd. ARROW-LEAVED ASTER. Dry open ground along railroads and roads; locally common. (*593*, *645*, *648*, *671*, *1998*, *2037*)

Aster umbellatus Miller. FLAT-TOPPED ASTER. Damp meadows, semi-open swamps, moist openings in woods, roadsides; common. (*532*)

Bidens cernua L. NODDING BUR-MARIGOLD or BEGGAR-TICKS. Swamps, mucky shores, marshes, wet ditches and roadsides; fairly common. (*625*, *662*, *795*, *1929*, *2023*, *2781*)

Bidens connata Muhl. PURPLE-STEMMED BEGGAR-TICKS. Swamps, wet roadsides, and other wet places; frequent. (*564*, *661*, *677*, *2079*)

Bidens coronata (L.) Britton TICKSEED-SUNFLOWER. Known from one location: common in a very wet open area along a small, slow moving stream in the CNF, with sedges and alder. (*1990*)

Bidens discoidea (Torrey & A. Gray) Britton. Sedgy lake shores; occasional. (*1731*, *2048*)

Bidens frondosa L. BEGGAR-TICKS, STICKTIGHT. Black ash-cedar swamps, stream margins; frequent. (*768*, *2010*, *2028*)

Bidens vulgata E. Greene TALL BEGGAR-TICKS. Occasional along roadsides and at the edges of farm fields; rather weedy. (*1999*)

Centaurea jacea L. BROWN KNAPWEED. Grassy roadsides; occasional. Europe. (*1715*, *1716*, *1860*, *1962*, *2549*)

Centaurea maculosa Lam. (*C. biebersteinii* DC.) SPOTTED KNAPWEED. Dry roadsides and other dry open areas of low fertility. This European introduction is a serious weed pest throughout much of North America, but at present occurs only locally in Taylor County. (*446*, *1967*, *2512*)

Centaurea montana L. MOUNTAIN-BLUET. Established in an open area at an old abandoned homesite. Europe. (*2438*)

Chrysanthemum leucanthemum L. (*Leucanthemum vulgare* Lam.) OX-EYE DAISY. Roadsides, old fields, disturbed open sites; abundant. Eurasia. (*261*)

Chrysanthemum serotinum L. (*C. uliginosum* (Willd.) Pers.) GIANT DAISY. Escaped from cultivation to damp roadside ditches, forming conspicuous patches; locally common. Europe. (*779*, *2155*, *2180*)

Cichorium intybus L. CHICORY. Known from only a few spots along roadsides and railroads. Europe. (*520*)

Cirsium arvense (L.) Scop. CANADA THISTLE. Common in roadsides, fields, disturbed places. Its habit of spreading underground makes this weedy pest difficult to eradicate. A white-flowered form, f. *albiflorum* E. L. Rand. & Redfield, was collected from an open roadside. From Eurasia, not Canada. (*422*, *539*)

Cirsium discolor (Muhl.) Sprengel FIELD or PASTURE THISTLE. Road banks, old gravel pits; occasional. (*1819*, *2729*)

Cirsium muticum Michaux SWAMP THISTLE. Swamps, wet thickets and meadows, roadsides; frequent to fairly common. (*562*, *1817*, *2550*)

Cirsium palustre (L.) Scop. EUROPEAN MARSH THISTLE. A potentially serious invader of natural wetlands, this European species is as yet only locally established along damp roadsides in the eastern half of the county. (*1478*, *2548*)

Cirsium vulgare (Savi) Ten. BULL THISTLE. A familiar weed of roadsides, old fields, pastures, farmyards, and weedy places. Eurasia. (*813*)

Conyza canadensis (L.) Cronq. (*Erigeron canadensis* L.) HORSEWEED. Road shoulders, gravel pits, gravel parking lots, and other disturbed habitats; fairly common. (*547*)

Coreopsis lanceolata L. SAND COREOPSIS. Locally along a dry roadside near Perkinstown and on a weedy bank of the Black River in Medford. Our occurrences doubtless represent escapes from cultivation. (*1407*, *2596*)

Coreopsis palmata Nutt. PRAIRIE COREOPSIS. Locally in a few prairie-like areas along railroad tracks in the western part of the county. (*601*)

Crepis tectorum L. HAWK'S BEARD. Gravelly roadsides, old gravel pits, other weedy places; frequent. Eurasia. (*301*, *388*, *1081*, *1249*, *1286*, *2152*)

Echinacea purpurea (L.) Moench PURPLE CONEFLOWER. A rare roadside escape; native farther south. (*1964*, *2035*)

Erechtites hieraciifolia (L.) Raf. FIREWEED. Wet meadows and shores, especially in ground exposed by lowered water levels; also along railroad tracks; locally common. Native but weedy in habit. (*2045*, *2056*, *2632*, *3433*)

Erigeron annuus (L.) Pers. ANNUAL FLEABANE. Disturbed gravelly ground; frequent. (*300*, *431*, *1331*)

Erigeron philadelphicus L. COMMON or PHILADELPHIA FLEABANE. Weedy along roadsides, but also occurring on moist shaded undisturbed river banks; occasional. (*1270*, *1586*, *1905*)

Erigeron strigosus Muhl. ROUGH FLEABANE. Roadsides, old fields, woodland clearings; fairly common. (*414*, *545*, *575*, *1327*)

Eupatorium maculatum L. SPOTTED JOE-PYE WEED. Wet meadows, swamps, marshes, stream margins, roadsides; common. (*525*, *2333*)

Eupatorium perfoliatum L. BONESET. In the same sorts of places as the above species, but somewhat less common. (*573*)

Eupatorium rugosum Houtt. WHITE SNAKEROOT. Very local in rich soil and light shade; our specimens are from a bank of the Black River and a moist railroad embankment. Sometimes placed in a separate genus as *Ageratina altissima* (L.) R. M. King & H. E. Robins. (*794*, *2121*)

Euthamia graminifolia (L.) Nutt. (*Solidago graminifolia* (L.) Salisb.) GRASS- LEAVED or FLAT-TOPPED GOLDENROD. Roadsides, railroads, old fields, meadows, usually in moist to damp ground; abundant. (*533*, *552*)

Euthamia gymnospermoides E. Greene (*Solidago gymnospermoides* (Greene) Fern.) Rare or extirpated; a small colony grew in a dryish railroad "prairie" in the southern part of the county, but the site was herbicided by the railroad company in 1997. (*618*)

Gaillardia pulchella Foug. BLANKET FLOWER. A rare roadside escape; native southwest of our area. (*1867*)

Galinsoga quadriradiata Ruiz & Pavon (*G. ciliata* (Raf.) S. F. Blake) QUICKWEED. An occasional weed of gardens and farmyards. From Central and South America. (*1802*, *2184*)

Gnaphalium obtusifolium L. CATFOOT, FRAGRANT CUDWEED. Dry open road banks and woods, old gravel pits; frequent. (*723*, *2150*, *2663*, *3438*)

Gnaphalium uliginosum L. LOW CUDWEED. Gravel road shoulders, sand and gravel bars in rivers; frequent. Europe. (*569*, *2138*, *2769*)

Grindelia squarrosa (Pursh) Dunal GUMWEED, TARWEED. Known from one location: common in gravelly soil along the abandoned railroad right-of-way in the village of Westboro. The bracts at the base of the flower heads are extremely sticky, hence the common names. Introduced from farther west. (*1723*)

Helenium autumnale L. SNEEZEWEED. Characteristic of stream margins, but also roadsides, old fields, and damp woods; common. (*574*, *1771*, *1820*, *2017*)

Helianthus annuus L. COMMON SUNFLOWER. An occasional roadside waif. Native farther west. Cultivated for oil and wild bird seed, though only occasionally in our area. (*1795*, *1927*, *2100*)

Helianthus decapetalus L. THIN-LEAVED SUNFLOWER. Our only record is from a dryish mixed woods in the CNF, where it was common in lightly shaded openings. (*3427*)

Helianthus giganteus L. TALL SUNFLOWER. Roadsides, river banks, old fields, clearings; very common. (*465*, *606*, *724*, *804*, *1621*, *1966*, *2145*)

Helianthus maximilianii Schrader MAXIMILIAN SUNFLOWER. Very local in dry open prairie-like areas along the Pine Line trail, a former railroad right-of-way (*3479*)

Helianthus occidentalis Riddell WESTERN SUNFLOWER. Locally common in dry railroad "prairies." (*597*, *598*, *2038*)

Helianthus pauciflorus Nutt. (*H. rigidus* (Cass.) Desf.) PRAIRIE SUNFLOWER. Known from a neglected weedy area alongside an alley in Medford, doubtless a garden escape. (*2848*)

Helianthus strumosus L. PALE-LEAVED SUNFLOWER. Railroads and road banks; occasional. (*489*, *555*, *595*, *649*)

Helianthus tuberosus L. JERUSALEM-ARTICHOKE. Occasional on river banks and along roadsides. Sometimes cultivated for its edible tubers; patches along roadsides probably represent escapes. (*2125*, *2164*, *2179*)

Hieracium aurantiacum L. ORANGE HAWKWEED, DEVIL'S PAINTBRUSH. Dry roadsides, old fields, lawns, cut-over woods, powerline right-of-ways, and just about any other open place, except the wettest; abundant. Europe. (*240*)

Hieracium kalmii L. var. fasciculatum (Pursh) LePage (*H. canadense* Michaux) CANADA HAWKWEED. Dry open sandy or gravelly places; occasional. (*548*, *596*)

Hieracium piloselloides Villars (*H. florentinum* All.) KING DEVIL, YELLOW HAWKWEED. Roadsides and other open disturbed sites; often abundant. Europe. (*259*, *1275*)

Hieracium scabrum Michaux ROUGH HAWKWEED. Dry open gravelly woods and borders, with aspen, paper birch, and balsam fir; occasional to frequent. (*740*, *1816*, *1872*)

Hieracium umbellatum L. (Am. plants sometimes segregated as *H. scabriusculum* Schwein.) NORTHERN HAWKWEED. Our one record is from the edge of a small sedge meadow at the base of a railroad embankment. (*1836*)

Krigia biflora (Walter) S. F. Blake DWARF-DANDELION. Common on an open bank of the Jump River. Our plants have glandular hairs on the peduncles and lower involucres, differing from those occurring south of the Tension Zone which are generally glabrous. The two have been given subspecies status by Iltis (see Johnson & Iltis 1963), with ours being ssp. *glandulifera* (Fern.) Iltis. (*1155*)

Lactuca biennis (Moench) Fern. TALL BLUE LETTUCE. Woodland clearings, roadsides, along railroads; tends to weediness; frequent. (*521*, *1761*, *1996*)

Lactuca canadensis L. WILD LETTUCE. Along railroads and roadsides, disturbed places in woods; frequent. (*1678*, *1694*, *1994*, *2058*, *2472*, *2633*, *2638*)

Liatris ligulistylis (A. Nels.) K. Schum. BLAZING STAR. Formerly fairly common in a few prairie-like areas along the railroad tracks in the southwestern part of the county, now much reduced in number due to herbicide use. (*599*)

Matricaria discoidea DC. (*M. matricarioides* (Less.) Porter) PINEAPPLE-WEED. Abundant along gravel road shoulders and in other disturbed places, but not competing well with taller vegetation. Adventive from American West. (*434*)

Matricaria recutita L. (*M. chamomilla* L.) WILD CHAMOMILE. Gravel roadsides; a rare escape. Eurasia. (*1459*, *2313*)

Megalodonta beckii (Torrey) E. Greene (*Bidens beckii* Torrey) WATER- MARIGOLD. Collected only from Little Chelsea Lake, but should be expected in other lakes and streams. (*2819*)

Petasites frigidus (L.) Fries var. palmatus (Aiton) Cronq. SWEET COLTSFOOT. Collected by Charles Goessl near Rib Lake in 1915: "Rich partly boggy woods. One colony." A more recent collection is without habitat data. (*Goessl 138 MIL*, 1915.; *Ruesch s.n. WIS*, 1958.)

Prenanthes alba L. WHITE LETTUCE, LION'S-FOOT, RATTLESNAKE-ROOT. Woods and borders, roadsides; frequent. (*581*)

Rudbeckia hirta L. (*R. serotina* Nutt.) BLACK-EYED SUSAN. Roadsides, railroads, old fields, and other open places; common. The cultivated version, called "Gloriosa Daisy," with rays having a reddish base, is a local escape. (*271*, *1901*)

Rudbeckia laciniata L. TALL or CUT-LEAF CONEFLOWER. Characteristic of rich open or lightly wooded floodplains, but also in moist roadsides, thickets, and wet meadows; fairly common. "Golden Glow," an escaped double horticultural form, is occasional. (*524*, *584*)

Senecio aureus L. (*Packera aurea* (L.) Löve & Löve) GOLDEN RAGWORT. Low woods and swamps, wet thickets, bottomland forests; frequent. (*197*, *1117*, *2260*)

Senecio pauperculus Michaux (*Packera paupercula* (Michaux) Löve & Löve) BALSAM or NORTHERN RAGWORT. Our one record is from near Long Lake, 3_ miles north of Rib Lake, but is without habitat information. (*Anderson 315 WIS*, 1947.)

Senecio vulgaris L. COMMON GROUNDSEL. Occasional in gardens and waste ground. Europe. (*731*, *1247*)

Silphium perfoliatum L. CUP PLANT. Abundant along a moist grassy roadside near Perkinstown, though likely escaped there. (*2598*)

Solidago canadensis L. CANADA GOLDENROD. There is a good deal of disagreement and confusion regarding the proposed segregates of this variable species, differentiated mainly by involucre size, pubescence, and flowering time. We appear to have at least two varieties: My own collections are all apparently var. scabra (Willd.) Torrey & A. Gray, known from roadsides, railroads, old fields, meadows, woods; probably abundant in Taylor County and often considered a distinct species (*S. altissima* L.). (*582*, *654*, *655*, *1957*)

In addition, two county specimens at WIS are labeled var. hargeri Fern.: found in the same sorts of habitats as var. *scabra* and likely at least common in our area. (*Nee 1271 WIS*, 1968.; *Gale & Struick s.n. WIS*, 1957.) The Gale & Struick specimen is further annotated as var. *gilvocanescens* Rydb., which Salamun (1963) says is the common variety in the state. However, according to Cronquist (1991), var. *gilvocanescens* occurs on the Great Plains, coming east only to Minnesota.

Finally, the typical variety and var. *salebrosa* (Piper) M. E. Jones (as defined by Cronquist) are also possible in our area.

Solidago flexicaulis L. ZIGZAG GOLDENROD. Moist woods; frequent. (*626*)

Solidago gigantea Aiton LATE GOLDENROD. Roadsides, borders of woods, river banks, old fields; abundant. (*529*, *546*, *805*, *1947*, *1972*, *2130*)

Solidago hispida Muhl. HAIRY GOLDENROD. Very local in dry open mixed woods. (*2052*)

Solidago juncea Aiton EARLY GOLDENROD. Dry open road banks; local. (*1809*)

Solidago nemoralis Aiton GRAY GOLDENROD. Dry open roadsides, sandy river banks; abundant in places. (*1916*, *1952*, *1965*, *2068*, *2116*)

Solidago rigida L. STIFF GOLDENROD. This dry prairie species is known from a single individual growing along the Pine Line recreational trail, a former railroad right- of-way (only a portion was taken for the voucher specimen). (*2036*)

Solidago uliginosa Nutt. BOG GOLDENROD. Wet meadows, marshes, swamps, bogs, roadsides; fairly common. (*543*, *633*, *670*, *1951*)

Sonchus arvensis L. var. *glabrescens* Guenther, Grab. & Wimmer (*S. uliginosus* M. Bieb.) SOW-THISTLE. Fairly common in moist weedy roadsides, fields and old fields, waste places. Europe. (*698*, *1458*, *1754*, *1993*)

Sonchus asper (L.) Hill SPINY or PRICKLY SOW-THISTLE. We have but two records for this weedy species—a newly reconstructed road shoulder and an unspecified habitat near Rib Lake. Europe. (*2002*; *Anderson 329 WIS.*)

Sonchus oleraceus L. COMMON SOW-THISTLE. Collected from pavement cracks in Medford and Stetsonville. Europe. (*2033*, *2948*)

Tanacetum parthenium (L.) Sch. Bip. FEVERFEW. (*Chrysanthemum parthenium* (L.) Bernh.; *Matricaria parthenium* L.). A weed at the edge of a gravely logging road near Rib Lake. Europe. (*2945*)

Tanacetum vulgare L. COMMON TANSY. Common along roadsides and in open disturbed places. An old-fashioned garden flower introduced from Europe. (*621*)

Taraxacum officinale G. Weber COMMON DANDELION. Ubiquitous in lawns, fields, gardens, roadsides, even woods. The vitamin A-rich leaves provide early spring greens, the flower buds food, the flowers wine, and the roasted roots a coffee substitute—not bad for a weed! From Eurasia. (*1012*, *2946*)

Tragopogon pratensis L. GOAT'S-BEARD. Gravelly roadsides and railroads; frequent. The flower heads generally close by early afternoon. Europe. (*1122*, *1211*, *1726*)

Additional records from adjacent counties:

Arctium lappa L. Lincoln: abandoned farm. Europe.

Artemisia campestris L. (*A. caudata* Michaux). Chippewa, Lincoln, Marathon: dry fields and roadsides.

Aster drummondii Lindley. Clark: clearing in woods, near a dwelling.

Aster hesperius A. Gray (*A. lanceolatus* Willd. ssp. *hesperius* (A. Gray) Semple & Chmielewski. Marathon: old field.

Aster laevis L. Lincoln, Marathon, Rusk: old fields, jack pine barrens.

Aster ericoides L. Chippewa, Marathon: old fields, prairies.

Aster praealtus Poiret (*A. coerulescens* DC.). Price: weedy rocky slope.

Aster sericeus Vent. Chippewa: sandy open area.

Aster tradescantii L. Clark, Lincoln: river bank, field. This species occurs east of Wisconsin; these WIS specimens may represent escapes or be in error.

Cirsium flodmanii (Rydb.) Arthur. Price: "Ladysmith," an old record. A state special concern species.

Cirsium hillii (Canby) Fern. Chippewa: rare in a mesic prairie. Threatened in Wisconsin.

Cirsium undulatum (Nutt.) Sprengel. Lincoln: no habitat data. Introduced from farther west.

Coreopsis grandiflora Hogg. Marathon: "Wausau." From southeastern U.S., escaped from cultivation.

Erigeron pulchellus Michaux. Chippewa: woods and open sites.

Gnaphalium macounii Greene. Lincoln, Price: dry woods and fields.

Helenium flexuosum Raf. (*H. nudiflorum* Nutt.). Marathon: damp grassy ditch. Native farther south.

Helianthus × laetiflorus Pers. Lincoln: field, riverbank. Hybrid of *H. pauciflorus* × *H. tuberosus*.

Helianthus mollis Lam. Lincoln: "Tomahawk." an old record.

Heliopsis helianthoides (L.) Sweet. Chippewa: moist meadow.

Inula helenium L. Lincoln, Marathon: farmland, low pasture. Eurasia.

Iva xanthifolia Nutt. Clark, Rusk: weedy places; native farther west.

Lactuca ludoviciana (Nutt.) Riddell. Chippewa, Lincoln, Price: roadsides, railroads, open places.

Liatris aspera Michaux. Clark, Chippewa, Marathon: roadsides, dry open places.

Liatris pycnostachya Michaux. Clark, Chippewa: roadsides.

Madia glomerata Hook. Price: railroad yard, an old record. Adventive from the far West.

Polymnia canadensis L. Clark: rich maple-basswood forest.

Ratibida pinnata (Vent.) Barnhart. Lincoln: "Council Grounds" (near Merrill).

Solidago ptarmicoides (Torrey & A. Gray) B. Boivin (*Aster ptarmicoides* (Nees) Torrey & A. Gray). Chippewa: sandy slope.

Solidago speciosa Nutt. Chippewa, Lincoln: dry open places.

Solidago ulmifolia Muhl. Chippewa, Price: edges of woods.

Taraxacum erythrospermum Andrz. (*T. laevigatum* (Willd.) DC.). Lincoln, Marathon: clearing, roadside, bog. Eurasia.

Tragopogon dubius Scop. Chippewa, Lincoln, Rusk: roadsides, railroads, dry sandy fields. Europe.

Vernonia fasciculata Michaux. Clark, Marathon: river banks.

BALSAMINACEAE Touch-me-not Family

Impatiens capensis Meerb. (*I. biflora* Willd.) ORANGE JEWELWEED, SPOTTED TOUCH-ME-NOT. In moist to wet places: woods, swamps, thickets, meadows, along streams, roadsides; abundant. (*478*)

Impatiens pallida Nutt. PALE TOUCH-ME-NOT, YELLOW JEWELWEED. Moist partly shaded river banks, forest edges; occasional. (*1713*, *1851*)

BERBERIDACEAE Barberry Family

Berberis thunbergii DC. JAPANESE BARBERRY. Cultivated and occasionally escaping to roadsides and degraded woods, as along the Yellow River in Gilman. Asia. (*1234*, *2034*)

Caulophyllum thalictroides (L.) Michaux BLUE COHOSH. Fairly common in rich deciduous woods. (*952*, *2226*)

Additional records from adjacent counties:
Podophyllum peltatum L. Clark, Marathon: woods.

BETULACEAE Birch Family

Alnus incana (L.) Moench ssp. rugosa (Duroi) R. T. Clausen SPECKLED ALDER. Abundant in wet places, often forming extensive thickets. Occasional in uplands. (*937*)

Betula alleghaniensis Britton (*B. lutea* Michaux) YELLOW BIRCH. In both mesic upland and lowland forests; common. An important component of the original hemlock- hardwood forest that once covered most of Taylor County. (*512*, *1246*, *2198*)

Betula papyrifera Marshall WHITE or PAPER BIRCH. Abundant in dry to wet forests; occasional in bogs. Like aspens, often colonizes disturbed sites. (*1008*, *1020*, *2521*)

Betula pumila L. (*B. gladulifera* (Regal) Butler) BOG or DWARF BIRCH. Bogs and conifer swamps; frequent; abundant in places. (*1163*, *2432*)

Carpinus caroliniana Walter ssp. virginiana (Marshall) Furlow AMERICAN HORNBEAM, MUSCLEWOOD, BLUE-BEECH, IRONWOOD. Moist to wet woods and thickets; fairly common. (*758*, *1173*, *1325*, *1350*)

Corylus americana Walter AMERICAN HAZELNUT. River banks, woods, thickets, openings; common. (*1205*, *1228*)

Corylus cornuta Marshall BEAKED HAZELNUT. In similar habitats as *C. americana*; abundant. (*1235*)

Ostrya virginiana (Miller) K. Koch IRONWOOD, EASTERN HOP-HORNBEAM. A characteristic small tree of the rich deciduous forest understory; common. (*1540*, *1798*)

Additional records from adjacent counties:
Alnus viridis (Villars) DC. ssp. crispa (Aiton) Turrill. Lincoln: woods near lakeshores.
Betula nigra L. Chippewa, Rusk: along streams and shores.
Betula ×sandbergii Britton. Lincoln, Rusk: bogs and conifer swamps. A hybrid of *B. papyrifera* × *B. pumila*, and intermediate in appearance.

BORAGINACEAE Borage Family

Hackelia virginiana (L.) I. M. Johnson STICKSEED, BEGGAR'S-LICE. Disturbed places in rich upland woods; rare to occasional. (*2477*)

Lithospermum canescens (Michaux) Lehm. HOARY PUCCOON. Occasional along railroad tracks in the western part of the county. (*652*, *1084*)

Myosotis arvensis (L.) Hill FIELD SCORPION-GRASS or FORGET-ME-NOT. Known from partly shaded disturbed sites near CNF campgrounds at Kathryn Lake and the Mondeaux Flowage. Europe. (*164*, *1281*)

Myosotis discolor Pers. (*M. versicolor* (Pers.) Sm.). In a house yard near Kathryn Lake. Europe. (*Brownell s.n. UWSP*, 1979; det. by T. S. Cochrane.)

Myosotis scorpioides L. TRUE FORGET-ME-NOT. Frequent in damp ground along streams. Eurasia. (*417*, *1225*, *1243*, *1252*, *1355*)

Myosotis sylvatica Hoffm. GARDEN FORGET-ME-NOT. Common in the lawn and brushy borders at the Kuse farmstead near Medford. Europe. (*2247*)

Symphytum officinale L. COMMON COMFREY. Frequently escaping to moist roadsides; especially well-established in the Lublin and Gilman areas. Will grow and flower in lightly shaded situations and is nearly impossible to eradicate once established. Eurasia. (*699*, *1445*)

Additional records from adjacent counties:
Cynoglossum boreale Fern. (*C. virginianum* L. var. *boreale* (Fern.) Cooperrider). Lincoln, Price: woods and edges.
Cynoglossum officinale L. Lincoln: pasture, woods. Eurasia.
Hackelia deflexa (Wahlenb.) Opiz var. americana (A. Gray) Fern. & I. M. Johnston. Clark: Neillsville area.
Lithospermum caroliniense (J. Gmelin) MacMillan. Chippewa: sandy open field.

BRASSICACEAE (CRUCIFERAE) Mustard Family

Alliaria petiolata (M. Bieb.) Cavara & Grande GARLIC MUSTARD. A serious weed pest in southeastern Wisconsin where it invades rich woodlands and crowds out native ground-layer species. Thus far our only record is from campsite #4 at the Kathryn Lake Camp-

ground in the CNF where seeds likely "hitchhiked" in with mud on the underside of a vehicle; discovered there in 1998 by Forest Service biologist Mariquita Sheehan. Garlic mustard is a biennial and first-year plants are often inconspicuous. To slow its establishment in our area, plants should be pulled and destroyed wherever found and infested sites revisited yearly until the residual seed supply is exhausted. Europe. (*3478*)

Arabis glabra (L.) Bernh. TOWER MUSTARD. Open gravelly areas; occasional. (*1264*, *2483*)

Arabis laevigata (Muhl.) Poiret SMOOTH ROCK CRESS. Gravelly or sandy wooded slopes and banks, especially along rivers; occasional to frequent. (*1027*, *1057*, *3268*)

Arabis missouriensis Greene var. deamii (Hopkins) Hopkins DEAM'S ROCKCRESS. One known site: dry steep sandy slopes in an old Forest Service gravel pit west of the Mondeaux River in the CNF. Renewed gravel extraction in 1996 may have eliminated this population. A Wisconsin special concern species. (*262*)

Barbarea vulgaris R. Br. YELLOW ROCKET, WINTER CRESS. A weed of fields, gardens, roadsides, stream edges, and almost any other disturbed area; abundant. Its flowers turn many a field yellow in spring, much to the disgust of farmers. Europe. (*880*, *899*)

Berteroa incana (L.) DC. HOARY ALLYSUM. Locally common along roadsides. Europe. (*1296*, *1886*)

Capsella bursa-pastoris (L.) Medikus SHEPHERD'S PURSE. Roadsides and other weedy places; frequent. Europe. (*464*, *954*, *2315*)

Cardamine bulbosa (Muhl.) BSP. (*C. rhomboidea* (Pers.) DC.) SPRING CRESS. Swampy areas in rich deciduous woods; along streams; occasional, except frequent in places along the Yellow River. (*948*, *1183*, *2974*, *3265*)

Cardamine pensylvanica Muhl. PENNSYLVANIA BITTERCRESS. In and along streams, wet spots in woods; frequent. (*912*, *1015*, *2004*, *2604*, *3258*)

Dentaria laciniata Willd. (*Cardamine concatenata* (Michaux) O. Schwarz) CUT-LEAVED TOOTHWORT. Rich moist forests; locally common, especially south. (*150*, *895*, *2244*, *3224*)

Erysimum cheiranthoides L. WORMSEED MUSTARD. Weedy places, often in rich soil; moist ground near streams; fairly common. Eurasia. (*433*, *462*, *1284*, *1338*, *1426*, *1604*, *1969*, *2120*)

Hesperis matronalis L. DAME'S ROCKET. Roadsides, open and wooded areas along the Jump River; a locally common garden escape. Europe. (*1149*, *1971*, *2368*, *3320*)

Lepidium densiflorm Schrader PEPPERGRASS. Weedy places along roads and railroads; gardens; frequent. Origin uncertain. (*1218*, *2561*)

Lepidium virginicum L. PEPPERGRASS. Occasional in a gravelly road shoulder along Hwy. 64. (*2342*)

Raphanis raphanistrum L. WILD RADISH. Roadsides, fields, waste places— especially around feed mills; frequent. Eurasia. (*459*, *460*, *1207*, *1248*, *2343*)

Rorippa palustris (L.) Besser (*R. islandica* (Murray) Borbas, misapplied) COMMON or MARSH YELLOW CRESS. Two varieties:

var. fernaldiana (Butters & Abbe) Stuckey. Ditches, wet spots in gravel pits, and other damp disturbed areas; frequent. (*508*, *1339*, *1572*, *1605*, *1680*)

var. hispida (Desv.) Rydb. A specimen collected from floating mats of muck and organic matter in a small lake (one of our many "Mud Lakes") appears to be this variety. (*2582*)

Sinapsis alba L. (*Brassica hirta* Moench; *B. alba* (L.) Rabenh.) WHITE MUSTARD. "Rib Lake. . . . Waste ground." Europe. (*Goessl 3038 MIL*, 1915)

Sinapsis arvensis L. (*Brassica kaber* (DC.) Wheeler) CHARLOCK, WILD MUSTARD. Weedy places; occasional. Generally thought to be of European origin, though at least one source claims it is native to the northeastern U.S. (*461*, *1206*)

Sisyrimbrium officinale (L.) Scop. HEDGE MUSTARD. "Weedy in a lawn." Europe. (*White 17 WIS*, 1949.)

Thlaspi arvense L. FIELD PENNY CRESS. Frequent in weedy disturbed areas. Europe. (*947*, *1204*, *2314*)

Excluded species:

Barbarea orthoceras Ledeb. NORTHERN WINTER CRESS. Two of our specimens from wet sand or mud along the Yellow River may be this. However, according to Patman and Iltis

(1961), this species does not occur in Wisconsin. In any case, the species of *Barbarea* are difficult to distinguish and it seems best to exclude it for now. (*1116*, *1233*)

Additional records from adjacent counties:
Alyssum alyssoides (L.) L. Marathon: open fields and waste places.
Arabis canadensis L. Rusk: wooded talus.
Arabis divaricarpa A. Nelson. Marathon, Rusk: railroads, clearings.
Arabis drummondii A. Gray. Chippewa, Rusk: woods, old fields, openings.
Arabis hirsuta (L.) Scop. var. pycnocarpa (Hopkins) Rollins. Rusk: in gravel.
Arabis lyrata L. Chippewa, Lincoln, Marathon: sandy places.
Armoracia lacustris (A. Gray) Al-Shehbaz & V. Bates (*A. aquatica* (A. Eaton) Wieg.). Lincoln: submersed in quiet water. Endangered in Wisconsin.
Armoracia rusticana Gaertn., Meyer & Scherb. Lincoln: garden weed.
Cardamine parviflora L. var. arenicola (Britton) O. E. Schulz. Clark: "Three miles north of Neillsville."
Conringia orientalis (L.) Dumort. Price: open sandy soil.
Dentaria diphylla Michaux (*Cardamine diphylla* (Michaux) A. Wood). Lincoln, Marathon, Price: damp rich deciduous woods.
Lepidium campestre (L.) R. Br. Marathon: roadside.
Rorippa sylvestris (L.) Besser. Lincoln: edge of Wisconsin River.
Sisyrimbrium altissimum L. Lincoln, Marathon: roadsides, old fields, railroads.

CABOMBACEAE Water-shield Family
Brasenia schreberi J. F. Gmelin WATER-SHIELD. Lakes and ponds; fairly common. (*1492*)

CALLITRICACEAE Water-starwort Family
Callitriche hermaphroditica L. AUTUMNAL WATER-STARWORT. Known only from slow water segments of Wood Creek, where associated with *Potamogeton richardsonii*. A Wisconsin special concern species. (*2607*)
Callitriche palustris L. (*C. verna* L.) WATER-STARWORT. Fairly common in shallow water or at the margins of streams and lakes. (*1458*, *1894*)

CAMPANULACEAE Bellflower Family
Campanula aparinoides Pursh (including *C. uliginosa* Rydb.) MARSH BELLFLOWER. Wet meadows, marshes, swamps; frequent. (*468*, *1513*, *1580*, *2580*)
Campanula rapunculoides L. ROVING or CREEPING BELLFLOWER. A frequent roadside escape. Europe. (*430*)
Campanula rotundifolia L. HAREBELL. Railroad "prairies," rock outcrop crevices along rivers, sandy open floodplains along the Jump River; frequent. (*600*, *2158*)
Lobelia inflata L. INDIAN-TOBACCO. Roadsides, fields, open woods, stream banks, especially in disturbed places; fairly common. (*554*, *1612*, *1693*, *1784*, *2529*)
Lobelia siphilitica L. GREAT BLUE LOBELIA. Stream margins, wet meadows; frequent. (*613*, *1786*, *1900*, *2832*)

Additional records from adjacent counties:
Lobelia dortmanna L. Lincoln, Price: lakes, in shallow water.
Lobelia spicata Lam. Chippewa: roadside.

CANNABACEAE Hemp Family
Humulus lupulus L. COMMON HOPS. Thickets, especially along streams and railroads; frequent. (*504*, *651*)

CAPRIFOLIACEAE Honeysuckle Family
Diervilla lonicera Miller BUSH-HONEYSUCKLE. Dry open woods—especially at edges; roadsides; fairly common. (*253*, *2042*)
Linnaea borealis L. TWINFLOWER. Dryish upland woods and elevated places in low woods; frequent. (*749*, *1257*, *2082*, *2366*)
Lonicera ×bella Zabel. Open woods, thickets, roadsides, in the vicinity of old homesites; locally common. *L. tatarica* is one of the parent species and both are potentially serious pests here, as they often are in southern Wisconsin. (*1047*, *1067*, *1113*; *Iwen 48 WIS*, 1956.)

Lonicera canadensis Marshall AMERICAN FLY HONEYSUCKLE. Common in a variety of woods, from dry to swampy. (*180*, *906*, *2214*, *2283*, *2299*)

Lonicera dioica L. WILD or GLAUCUS HONEYSUCKLE. Forests and thickets, ranging from rocky wooded slopes to cedar swamps; frequent. (*1075*, *1181*, *1456*, *2267*)

Lonicera hirsuta Eaton HAIRY HONEYSUCKLE. Damp to dryish mixed woods; frequent. (*2410*, *2424*, *2485*)

Lonicera tatarica L. TARTARIAN HONEYSUCKLE. Escaped to disturbed open woods and thickets, especially along rivers. As noted by Voss (1996), this species and *L.* ×*bella* are often difficult to differentiate because of presumed backcrossing. Eurasia. (*1066*, *1864*)

Lonicera villosa (Michaux) Schultes (included in *L. caerulea* L. by some authors) MOUNTAIN FLY HONEYSUCKLE. Cedar swamps and mixed swamps of tamarack, black ash, balsam fir, or alder; frequently encountered within its relatively restricted habitat, but never in great numbers. (*1170*, *2324*, *2434*, *2699*)

Sambucus canadensis L. COMMON ELDER. Woods edges, roadsides, usually in damp ground; frequent. (*420*)

Sambucus racemosa L. ssp. pubens (Michaux) House (*S. pubens* Michaux) RED- BERRIED ELDER. Rich mesic deciduous forests, mixed woods, openings and edges; common. The flowers attract Junebugs, the appearance of the two often coinciding in spring. (*971*)

Symphoricarpos occidentalis Hook. WOLFBERRY. Our one record is from an upland grassland in the Pershing State Wildlife Area, near an old, nearly obliterated homesite. (*1824*)

Triosteum aurantiacum E. P. Bicknell HORSE-GENTIAN. Upland woods, especially in small openings and at edges; rare to occasional. (*2843*, *2846*)

Viburnum acerifolium L. MAPLE-LEAVED VIBURNUM. Fairly common in dry to moist woods. (*257*, *476*)

Viburnum dentatum L. ARROW-WOOD. Locally in thickets on upper banks of the Yellow River near Gilman, where it is likely an escape. (*2202*)

Viburnum lentago L. NANNYBERRY. Damp thickets and woods edges, stream banks, roadsides; frequent. (*1049*, *1107*, *2124*)

Viburnum opulus L. var. americanum Aiton (*V. trilobum* Marshall) HIGHBUSH- CRANBERRY, CRANBERRY VIBURNUM. Wet thickets and roadsides, swamps, dryer ground around old homesites where probably planted; occasional to frequent. (*443*, *1189*, *2401*)

Viburnum rafinesquianum Schultes var. rafinesquianum DOWNY ARROW- WOOD. Upland woods, thickets, and clearings; occasional. (*1119*, *1169*, *1224*)

Additional records from adjacent counties:

Lonicera oblongifolia (Goldie) Hook. Price: low woods.

Symphoricarpos albus (L.) S. F. Blake. Lincoln: coniferous woods, river bluff, dry sandy open area.

CARYOPHYLLACEAE Pink Family

Arenaria lateriflora L. GROVE SANDWORT. Locally on shaded stream banks along the Jump and Black Rivers. Also known from a damp roadside in the CNF. (*1154*, *1792*, *3351*)

Cerastium arvense L. FIELD CHICKWEED. "Hillside of former farm land." (*Kettleson 13 WIS*, 1958.)

Cerastium vulgatum L. (*C. fontanum* Baumg.) MOUSE-EAR CHICKWEED. Lawns, roadsides, woods, and disturbed places; our commonest chickweed. Eurasia. (*293*, *970*, *1104*, *2256*)

Dianthus armeria L. DEPTFORD PINK. Open grassy places, in soil ranging from sandy to clay; occasional. Europe. (*425*)

Dianthus barbatus L. SWEET WILLIAM. Cultivated and occasionally escaping to grassy roadsides in the Medford area. Europe. (*1250*)

Dianthus plumarius L. GARDEN or GRASS PINK. Escaped from a planting to a roadside in Hannibal. Europe. (*1294*)

Gypsophila muralis L. BABY'S BREATH. Established locally in a gravel pit, a road shoulder, and a gravel-surfaced parking lot. Eurasia. (*2093*, *2531*, *2771*)

Lychnis chalcedonica L. MALTESE CROSS, SCARLET LYCHNIS. Known from a moist overgrown roadside in Lublin—doubtless a garden escape and perhaps not long- persisting. Asia. (*1865*)

Lychnis flos-cuculi L. RAGGED ROBIN. Well established in a roadside near Sackett Lake, a good distance from any residence. I am unable to find a previous collection record for this species from Wisconsin. Europe. (*3303*)

Myosoton aquaticum (L.) Moench (*Stellaria aquatica* (L.) Scop.) GIANT CHICKWEED. Frequent in moist places along streams. Also known from dry soil in a red pine plantation. Europe. (*797, 1221, 1334, 1521, 1598*)

Saponaria officinalis L. BOUNCING BET, SOAPWORT. Cultivated and frequently escaping to roadsides and old fields, becoming locally abundant. Flowers often double. Eurasia. (*540, 1461*)

Scleranthus annuus L. KNAWEL. A weed of gravelly disturbed places; occasional. Eurasia. (*1797, 2532*)

Silene antirrhina L. SLEEPY CATCHFLY. Occasional in dry gravel along railroad tracks. (*1744*)

Silene armeria L. SWEET WILLIAM CATCHFLY. Collected from the edge of a road near Lublin where it appears to have arrived in fresh gravel. Occasionally cultivated in flower gardens. Europe. (*1810*)

Silene cserei Baumg. Occasional along railroad tracks; locally common along the Pine Line recreational trail, a former railroad right-of-way. Southeastern Europe. (*702, 1675, 1882, 2559*)

Silene latifolia Poiret (*Lychnis alba* Miller) WHITE CAMPION. Roadsides and disturbed sites; a common weed. Europe. (*303, 834*)

Silene noctiflora L. NIGHT-FLOWERING CATCHFLY. One record: a recently reconstructed gravel roadside near Gilman, apparently arriving with the gravel, along with a wide variety of other weedy species. Europe. (*1646*)

Spergula arvensis L. CORN SPURREY. A weed of farm fields, roadsides, and waste places; frequent. Europe. (*1665, 1804, 2530, 2823*)

Spergularia rubra (L.) J. & C. Presl SAND SPURREY. Gravelly road shoulders and driveways; gravel pits; occasional to frequent. Europe. (*245, 1454, 2525*)

Stellaria borealis Bigelow (*S. calycantha* (Ledeb.) Bong., misapplied). Our one record is without habitat data. Generally found in damp shaded places. (*Anderson 72 WIS*, 1947.)

Stellaria graminea L. COMMON STITCHWORT, STARWORT. Moist grassy roadsides and old fields; common in places. Europe. (*325, 2340*)

Stellaria longifolia Muhl. LONG-LEAVED STITCHWORT or STARWORT. Wet meadows, swamps, pond borders; often growing in tangled masses; frequent. (*1312, 2647*)

Stellaria media (L.) Villars COMMON CHICKWEED. Lawns, gardens, weedy places. Does not seem to be especially common in Taylor County, though most floras from our region list it as an abundant weed. Eurasia. (*2681*)

Additional records from adjacent counties:

Petrorhagia saxifraga (L.) Link (*Tunica saxifraga* (L.) Scop.) Lincoln: roadside.

Silene dichotoma Ehrh. Lincoln: roadsides and fields.

Silene vulgaris (Moench) Garcke (*S. cucubalus* Wibel) Lincoln, Marathon, Price: roadsides; gravel bars in a river.

CELASTRACEAE Staff-tree Family

Celastrus scandens L. AMERICAN BITTERSWEET. Open upland woods and borders, thickets; occasional. Though Seymour (1960) wrote that it was never seen in flower or fruit in Lincoln County, it does at least flower in Taylor County. (*1190, 1263*)

CERATOPHYLLACEAE Hornwort Family

Ceratophyllum demersum L. HORNWORT, COONTAIL. Abundant in many lakes, ponds, and backwaters of streams. (*1151, 1414, 2571*)

Ceratophyllum echinatum A. Gray. Known from James Lake and a flowage in the Pershing State Wildlife Area. A Wisconsin special concern species. (*1828, 2617*)

CHENOPODIACEAE Goosefoot Family

Chenopodium album L. LAMB'S QUARTERS. A common weed of roadsides, fields, and gardens. Various segregates have been proposed for this variable species. Some of our material might be referred to *C. berlandieri* Moq., a very similar but native species. The

younger leaves make an acceptable cooked green, similar to spinach. Europe. (*289*, *1738*, *2670*, *2676*, *2767*)

Chenopodium capitatum (L.) Aschers STRAWBERRY BLITE. Occasional in forest clearings and gravelly places following disturbance. (*1794*, *3300*)

Chenopodium gigantospermum Aellen (*C. simplex* (Torrey) Raf.) (*C. hybridum* L. var. *gigantospermum* (Aellen) Rouleau) MAPLE-LEAVED GOOSEFOOT. Recently constructed roadsides, woodland trails; occasional. Sometimes considered conspecific with the European *C. hybridum*. (*1644*, *2555*)

Chenopodium glaucum L. OAK-LEAVED GOOSEFOOT. A locally common weed of disturbed places. Europe. (*1634*, *2690*)

Chenopodium polyspermum L. Known from gravelly open ground along the railroad tracks in downtown Medford. This weedy Eurasian species appears to be quite rare in our region; neither Voss (1985) nor Swink and Wilhelm (1994) mention it. (*2934*)

Kochia scoparia (L.) Schrader SUMMER-CYPRESS. Locally common in a weedy area along the railroad tracks in Gilman. Asia or Europe. (*2628*)

Salsola kali L. var. *tenuifolia* Tausch (*S. tragus* L.) RUSSIAN THISTLE. A spiny tumbleweed occasionally found in dry gravel or sand along railroad tracks. Asia. (*793*, *1869*)

Additional records from adjacent counties:

Cycloloma atriplicifolium (Sprengel) J. Coulter. Lincoln: filled in land. May be adventive from west and south.

CISTACEAE Rockrose Family

Helianthemum bicknellii Fern. FROSTWEED. One small patch in a sandy railroad "prairie." (*585*)

Lechea intermedia Leggett PINWEED. In dry open woods and along railroads; occasional. (*1736*, *2013*, *2053*, *2592*, *2669*)

Additional records from adjacent counties:

Helianthemum canadense (L.) Michaux. Clark: "White Mound."

Hudsonia tomentosa Nutt. Clark: "White Mound."

CLUSIACEAE (GUTTIFERAE, HYPERICACEAE) St. John's-wort Family

Hypericum boreale (Britton) Bickn. Lake shores, bogs, wet meadows; fairly common. (*1579*, *1847*, *1933*, *2047*)

Hypericum ellipticum Hook. Occasional in moist open ground at the margins of rivers. (*1450*, *1597*)

Hypericum kalmianum L. KALM'S ST. JOHN'S-WORT. One record: a large, spreading patch in a sandy roadside clearing in the Taylor County Forest. (*2536*)

Hypericum majus (A. Gray) Britton. Moist meadows, shores, roadsides, often in disturbed places; common. (*1636*, *1647*, *1805*, *1807*, *1859*, *2622*, *2770*)

Hypericum perforatum L. COMMON ST. JOHN'S-WORT. Common along roadsides and railroads. Europe. (*396*, *787*)

Hypericum punctatum Lam. SPOTTED ST. JOHN'S-WORT. Moist roadsides, river banks, old fields; frequent. (*726*, *1611*, *1789*, *2834*)

Hypericum pyramidatum Aiton (*H. ascyron* L.) GREAT ST. JOHN'S-WORT. Roadsides, old fields, meadows, often in damp ground; frequent to fairly common. (*466*)

Triadenum fraseri (Spach) Gleason MARSH ST. JOHN'S-WORT. Bogs, marshes, shores, wet meadows; frequent. (*683*, *2433*)

Additional records from adjacent counties:

Hypericum canadense L. Lincoln: ditch.

CONVOLVULACEAE Morning-glory Family

Calystegia sepium (L.) R. Br. (*Convolvulus sepium* L.) HEDGE BINDWEED. Moist thickets, disturbed woods; occasional. (*614*, *1405*)

Calystegia spithamaea (L.) Pursh (*Convolvulus spithamaeus* L.) LOW BINDWEED. Dry sandy open woods and road banks; locally common. (*258*, *1307*)

Convolvulus arvensis L. FIELD BINDWEED. Though sometimes a serious weed pest to the south of us, this species appears to be rare in Taylor County—known only from waste ground in Medford. Europe. (*1417*)

CORNACEAE Dogwood Family

Cornus alternifolia L.f. ALTERNATE-LEAVED or PAGODA DOGWOOD. Moist woods and edges, thickets; frequent. (*345*, *1144*, *2482*)

Cornus amomum Miller (*C. obliqua* Raf.) SILKY or PALE DOGWOOD. Marshy places along streams; occasional. Also known from a rather dry brushy roadside, though perhaps originally planted at that location. (*2570*)

Cornus canadensis L. BUNCHBERRY. Dry to swampy, mainly coniferous, woods; common. (*187*, *710*)

Cornus racemosa Lam. (*C. foemina* Miller) GRAY DOGWOOD. Roadsides, borders of woods, thickets, old pastures; frequent. (*1168*, *1353*, *1451*, *1663*, *2399*)

Cornus rugosa Lam. ROUND-LEAVED DOGWOOD. Upland woods and thickets; very local, but can be abundant, as on the southern end of the Mondeaux Esker. (*2481*)

Cornus stolonifera Michaux (*C. sericea* L.) RED-OSIER DOGWOOD. Common in swamps, marshes, wet roadsides, and other moist to wet places. (*1133*)

CRASSULACEAE Stonecrop Family

Sedum acre L. MOSSY STONECROP, WALLPEPPER. Growing abundantly in a lawn and adjacent sidewalk cracks in the village of Rib Lake. Eurasia. (*1362*)

Sedum purpureum (L.) Schultes (*S. telephium* var. *purpureum* L.) LIVE- FOREVER. Cultivated and rather frequently escaping to roadsides and old fields. The common name is appropriate, as it seems to live forever in the plant press. Eurasia. (*576*)

CUCURBITACEAE Gourd Family

Echinocystis lobata (Michaux) Torrey & A. Gray WILD CUCUMBER. Primarily in damp thickets or open ground along streams; fairly common. (*469*, *605*)

Additional records from adjacent counties:

Sicyos angulatus L. Price: wet thicket.

CUSCUTACEAE Dodder Family

Cuscuta gronovii Willd. COMMON DODDER. Frequent in damp ground bordering streams and ponds where it is parasitic on a variety of mostly herbaceous plants. (*796*, *1814*, *1884*, *1970*, *2005*, *2841*)

DROSERACEAE Sundew Family

Drosera intermedia Hayne. In very wet bogs—even in water at the edges of bog pools, where the stems sometimes lengthen to 15 cm or more; occasional. (*1365*, *2110*, *2407*, *2752*)

Drosera rotundifolia L. ROUND-LEAVED SUNDEW. Sphagnum bogs; fairly common. Sundews have leaves with stalked glands that secrete a sticky substance. Small insects are trapped on these glands and then slowly digested. (*680*, *771*, *2111*, *2408*)

ELATINACEAE Waterwort Family

Elatine minima (Nutt.) Fischer & C. Meyer WATERWORT. Locally common in shallow water of sand-bottomed soft water lakes and ponds. (*2794*, *2804*, *2845*)

ERICACEAE Heath Family

Andromeda glaucophylla Link BOG-ROSEMARY. Sphagnum bogs; frequent. (*1017*)

Chamaedaphne calyculata (L.) Moench LEATHERLEAF. Abundant in sphagnum bogs, sometimes at the leading edge of vegetation pioneering open water. (*891*)

Epigaea repens L. TRAILING ARBUTUS. Dryish coniferous or mixed woods; occasional. (*736*, *2402*, *2727*)

Gaultheria hispidula (L.) Muhl. CREEPING SNOWBERRY. Damp woods and slightly elevated areas in conifer swamps and bogs; frequent. (*976*)

Gaultheria procumbens L. WINTERGREEN, CHECKERBERRY, TEABERRY. Common in damp to dry mixed woods of medium to low fertility; occasional in swamps and bogs. (*2085*)

Kalmia polifolia Wangenh. BOG- or PALE-LAUREL. Sphagnum bogs; frequent. There is some question as to the correct spelling of the specific epithet: it should possibly be *polifolia*. (*1016*, *2200*, *2489*)

Ledum groenlandicum Oeder LABRADOR-TEA. Abundant in sphagnum bogs and conifer swamps. (*692*, *1018*)

Vaccinium angustifolium Aiton LOWBUSH BLUEBERRY. Dry sandy or rocky woods; occasional. (*1097*, *1840*, *2442*)

Vaccinium macrocarpon Aiton CRANBERRY. In sphagnum bogs, especially in the wettest areas, as at the edges of bog pools or lakes; fairly common. Our cultivated cranberry is this species. (*1142*, *1376*)

Vaccinium myrtilloides Michaux VELVETLEAF or CANADA BLUEBERRY. Dry to damp open woods, bogs, swamps; common. (*579*, *824*, *1011*)

Vaccinium oxycoccos L. SMALL CRANBERRY. Sphagnum bogs; fairly common. (*1197*, *1326*, *2490*)

Additional records from adjacent counties:

Arctostaphylos uva-ursi (L.) Spengel. Lincoln: dry open woods and roadsides.

Gaylussacia baccata (Wangenh.) K. Koch. Clark, Chippewa: bogs, roadsides.

Vaccinium cespitosum Michaux. Chippewa, Lincoln: along rivers. Endangered in Wisconsin.

EUPHORBIACEAE Spurge Family

Acalypha rhomboidea Raf. THREE-SEEDED MERCURY. Known from damp disturbed ground along the Black River, south, and as a garden weed in Medford. (*2174*, *2563*)

Euphorbia corollata L. FLOWERING SPURGE. Fairly common in dry ground along railroad tracks. (*339*, *616*, *784*)

Euphorbia cyperissias L. CYPRESS SPURGE. Occasional in cemeteries and near old homesites, persisting and spreading from cultivation. Sometimes called "graveyard spurge." Eurasia. (*516*, *1209*)

Euphorbia esula L. LEAFY SPURGE. One small patch along railroad tracks near Gilman. Eurasia. (*1626*)

Euphorbia glyptosperma Engelm. (*Chamaesyce glyptosperma* (Engelm.) Small) Along railroad tracks; local. (*535*, *1628*)

Euphorbia maculata L. (*E. supina* Raf.; *Chamaesyce maculata* (L.) Small) MILK-PURSLANE. In railroad track ballast. (*1709*, *2677*, *2678*)

Euphorbia nutans Lag. (*E. maculata* L., misapplied; *Chamaesyce nutans* (Lag.) Small) EYE-BANE. Fairly common in dry gravel in one spot along the railroad tracks in Gilman. (*2630*)

Euphorbia vermiculata Raf. (*Chamaesyce vermiculata* (Raf.) House HAIRY SPURGE. In cinders along an abandoned railroad siding in Lublin. Probably a native species. (*704*)

Additional records from adjacent counties:

Euphorbia geyeri Engelm. (*Chamaesyce geyeri* (Englm.) Small). Lincoln: sandy roadsides.

Euphorbia serpyllifolia Pers. (*Chamaesyce serpyllifolia* (Pers.) Small). Lincoln: roadside, riverbank.

FABACEAE (LEGUMINOSAE) Pea or Bean Family

Amphicarpaea bracteata (L.) Fern. HOG-PEANUT. In moist upland woods, often becoming abundant after logging. A variable species that is sometimes segregated into varieties. (*359*, *592*)

Apios americana Medikus GROUNDNUT. Apparently restricted to woods, thickets, and open areas along the Jump River, where locally common. (*1596*, *1855*)

Astragalus cicer L. CHICK-PEA MILK-VETCH. Common on open sandy slopes in an abandoned gravel pit off Forest Road 121 in the CNF. The site is used as a camping and staging area by horseback trail riders and also gets heavy off-road-vehicle use. This appears to be the first documented report of this species in Wisconsin. Europe. (*1545*)

Baptisia lactea (Raf.) Thieret (*B. leucantha* Torrey & A. Gray) WHITE FALSE INDIGO. Locally common in the narrow open floodplain along the Jump River, a habitat it shares with numerous prairie species. Also known from a grassy roadside bank near Chelsea. (*1861*, *2600*, *3365*)

Caragana arborescens Lam. PEA-TREE. A cultivated shrub or small tree, occasionally escaping. Our collections are from a roadside in Gilman and a red pine plantation heavily used by off-road-vehicles in the CNF, where it was common. Northern Asia. (*1106*, *1546*)

Coronilla varia L. CROWN-VETCH. Roadsides; common. Europe. (*441*, *1978*)

Dalea candida Willd. (*Petalostemum candidum* (Willd.) Michaux) WHITE PRAIRIE-CLOVER. A single robust clump growing in well-drained gravelly soil along railroad tracks north of Gilman. Associates included *Andropogon gerardii* and *Euphorbia corollata*. (*1835*)

Desmodium canadense (L.) DC. SHOWY TICK-TREFOIL. Occasional; known from a roadside, a railroad right-of-way, and an old gravel pit. (*800*, *1547*, *1813*)

Desmodium glutinosum (Muhl.) Alph. Wood POINTED-LEAF TICK-TREFOIL. Frequent in upland deciduous woods, especially after disturbance. (*401*)

Lathyrus ochroleucus Hook. PALE VETCHLING. Dryish woods and borders; occasional to frequent. (*1079*, *1245*)

Lathyrus palustris L. MARSH VETCHLING or PEA. Known from a grassy railroad right-of-way and an open sandy floodplain along the Jump River, in both instances associated with various mesic prairie species. (*620*, *3323*)

Lathyrus sylvestris L. EVERLASTING PEA. Locally abundant along roadsides, especially in the CNF near Perkinstown where it is also invading red pine plantations. Europe. (*412*)

Lathyrus venosus Muhl. var. intonsus Butters & St. John VEINY PEA. Frequent in a few dry railroad "prairies." (*341*, *1201*)

Lezpedeza capitata Michaux ROUND-HEADED BUSH-CLOVER. Locally in dry open ground near Lake Eleven and on a dry sandy road bank near Salem Lake, both in the CNF. (*1844*, *2668*)

Lotus corniculatus L. BIRDSFOOT TREFOIL. Occasional on dry open disturbed sites. Eurasia. (*264*)

Lupinus polyphyllus Lindley GARDEN LUPINE. Cultivated and occasionally escaping to roadsides. Western North America. (*1251*, *2546*)

Medicago lupulina L. BLACK MEDIC. Disturbed open areas, as along roadsides and railroads; frequent. Eurasia. (*1216*, *1710*)

Medicago sativa L. ALFALFA. A frequent escape to roadsides and old fields. Origin probably Asia. (*427*)

Melilotus alba Medikus WHITE SWEET CLOVER. Fairly common along roadsides and in weedy places. Asia. (*389*)

Melilotus officinalis (L.) Pallas YELLOW SWEET CLOVER. In similar habitats to *M. alba*, and also fairly common. Eurasia. (*397*)

Pisum sativum L. GARDEN PEA. Spontaneous in a weedy, recently reconstructed roadside; not persisting. Frequently planted as a fodder crop in mixture with grasses. Eurasia. (*1887*)

Robinia hispida L. BRISTLY LOCUST, ROSE-ACACIA. Spreading slightly from cultivation to a roadside. Native to the southeastern U.S. (*1631*)

Robinia pseudoacacia L. BLACK LOCUST. Introduced from farther south. Locally in upland woods, roadsides, and old gravel pits, forming thickets. (*1132*, *2540*)

Trifolium arvense L. RABBIT-FOOT CLOVER. Abundant, though somewhat localized, along gravel road shoulders, in old gravel pits, and other dry sandy disturbed ground. Europe. (260, *792*, *2764*)

Trifolium aureum Pollich (*T. agrarium* L.) HOP CLOVER. Common in roadsides, fields, and weedy places. Eurasia. (*321*)

Trifolium campestre Schreber (*T. procumbens* L.) LOW HOP CLOVER. Locally abundant along gravel road shoulders in the northeastern quarter of the county. Europe. (*3397*)

Trifolium hybridum L. ALSIKE CLOVER. Roadsides, old fields, and other open places; very common. Eurasia. (*277*)

Trifolium pratense L. RED CLOVER. Roadsides, old fields, other open sites; abundant. A common forage and hay crop. Europe. (*278*, *1925*)

Trifolium repens L. WHITE CLOVER. Familiar and abundant in lawns, pastures, roadsides. Europe. (*279*)

Vicia americana Muhl. AMERICAN VETCH. In a variety of habitats, including roadsides, railroads, and river banks; fairly common. (*340*, *1202*, *1457*, *2136*, *2341*)

Vicia angustifolia L. (*V. sativa* L. ssp. *nigra* (L.) Ehrh.) NARROW-LEAVED VETCH. Occasional in old fields and along roadsides. Europe. (*1337*, *1620*)

Vicia cracca L. BIRD, COW, or TUFTED VETCH. In weedy places along railroad tracks; frequent. Eurasia. (*1215*, *1419*)

Vicia villosa Roth HAIRY VETCH. Grasslands and weedy places. Eurasia. (*1641*)

Additional records from adjacent counties:

Amorpha canescens Pursh Chippewa: roadsides, rocky areas along Chippewa River.

Baptisia bracteata Elliott var. leucophaea (Nutt.) Kartesz & Gandhi (*B. leucophaea* Nutt.). Chippewa: sandy woods and openings.

Lathyris latifolius L. Chippewa: road embankment.

Lupinus perennis L. Clark, Chippewa: open sandy areas.

Strophostyles leiosperma (T. & G.) Piper. Lincoln: sandy roadside.

Vicia caroliniana Walter. Chippewa, Marathon: wooded hillsides.

FAGACEAE Beech Family

Quercus alba L. WHITE OAK. Apparently restricted to the southwestern corner of the county where it is occasional in upland woods. (*2850*, *2853*)

Quercus bicolor Willd. SWAMP WHITE OAK. Locally south in the bottomlands along the Black River. Also known from the Pershing State Wildlife Area. (*1064*; (*Manville s.n. UWSP*, 1974.)

Quercus ellipsoidalis E. J. Hill HILL'S OAK, NORTHERN PIN OAK. Taylor County generally lacks the sandy soils favored by this species, but a few individuals are known from well-drained roadsides in the northeastern quarter of the county. (*2522*, *2523*)

Quercus macrocarpa Michaux BUR OAK. Fairly common in pastures and other open places, and in woods—especially along rivers. Often in poorly-drained soil. (*1584*, *2122*, *2132*, *2833*)

Quercus rubra L. NORTHERN RED OAK. Upland woods; common. Heavily logged in recent years. (*815*)

FUMARIACEAE Fumitory Family

Corydalis sempervirens (L.) Pers. PALE or PINK CORYDALIS. Occasional in disturbed woodlands and gravel pits. (*239*, *3298*)

Dicentra canadensis (Goldie) Walp. SQUIRREL-CORN. Rich moist deciduous woods, often growing with the next species; very local in Taylor County, though abundant at two of our known locations. (*990*, *2242*, *2288*)

Dicentra cucullaria (L.) Bernh. DUTCHMAN'S-BREECHES. Locally common to abundant in rich deciduous woods. (*875*, *2228*)

Additional records from adjacent counties:

Corydalis aurea Willd. Lincoln: gravel pit.

GENTIANACEAE Gentian Family

Gentiana andrewsii Griseb. CLOSED or BOTTLE GENTIAN. Moist roadsides, old fields, and meadows; occasional to frequent. (*714*, *1997*, *2149*)

Gentianopsis crinita (Froel.) Ma (*Gentiana crinita* Froel.) FRINGED GENTIAN. Rare or extirpated; a few plants grew in moist gravelly soil in a railroad "prairie" near the south county line, but the site was herbicided in 1997 by the Wisconsin Central. (*2146*)

Additional records from adjacent counties:

Gentiana alba Muhl. (*G. flavida* A. Gray). Chippewa: sandy open area.

Gentiana puberulenta J. S. Pringle (*G. puberula* Michaux). Chippewa: sandy open site.

Gentiana rubricaulis Schwein. Lincoln, Price: damp ground.

Halenia deflexa (Sm.) Griseb. Lincoln, Rusk: damp shaded places.

GERANIACEAE Geranium Family

Geranium bicknellii Britton. Disturbed gravelly places, such as gravel pits; not common. (*244*)

Geranium maculatum L. WILD GERANIUM. Rich deciduous woods; frequent. (*135*)

GROSSULARIACEAE Gooseberry Family

Ribes americanum Miller WILD BLACK CURRANT. Woods, thickets, swamps; frequent. (*1026*, *2259*, *2323*)

Ribes cynosbati L. PRICKLY GOOSEBERRY. Moist deciduous woods, clearings; common. (*178*, *977*, *1032*, *1046*, *1682*, *2239*, *2519*, *3221*, *3347*)

Ribes glandulosum Grauer SKUNK CURRANT. Damp or swampy woods and thickets, river banks; common. (*925*, *1031*, *1037*, *1471*, *2258*, *2272*, *2308*, *2356*, *3241*)

Ribes hirtellum Michaux SMOOTH or SWAMP GOOSEBERRY. Low woods. Our known collections are from the Town of Browning. (*Piehl 106 WIS*, 1955; *Ruesch 32 WIS*, 1958.)

Ribes missouriense Nutt. MISSOURI GOOSEBERRY. River banks, fencerows; locally common south. (*965*, *968*, *1025*, *2221*, *2245*, *2452*)

Ribes sativum Syme (*R. rubrum* L.) RED or GARDEN CURRANT. Cultivated and occasionally escaping to fencerows and borders of woods. Europe. (*2246*)

Ribes triste Pallas SWAMP RED CURRANT. Damp to wet woods; fairly common. (*894*, *921*, *2326*, *3242*)

Additional records from adjacent counties:

Ribes hudsonianum Richardson Lincoln: "Unburned bog." A state special concern species.

Ribes odoratum H. A. Wendl Lincoln: cultivated and escaping to various habitats. Native farther west.

HALORAGACEAE Water-milfoil Family

Myriophyllum farwellii Morong FARWELL'S WATER-MILFOIL. Known only from James Lake. A state special concern species. (*2612*)

Myriophyllum sibiricum Komarov (*M. exalbescens* Fern.) COMMON WATER- MILFOIL. Lakes and ponds; common. (*1413*, *1554*, *1567*, *2854*)

Myriophyllum tenellum Bigelow. Collected only from South Harper Lake, but should be expected in other sand-bottomed soft water lakes; easily overlooked because often growing in deep water. (*2623*)

Additional records from adjacent counties:

Myriophyllum heterophyllum Michaux. Chippewa, Lincoln: lakes and rivers.

HAMAMELIDACEAE Witch Hazel Family

Hamamelis virginiana L. WITCH-HAZEL. Frequent in upland deciduous woods. The flowers appear in the fall. (*772*, *817*, *1128*, *1537*, *2069*, *2852*)

HIPPOCASTANACEAE Buckeye or Horse-chestnut Family

Aesculus glabra Willd. OHIO BUCKEYE. Native south of Wisconsin, but hardy here and sometimes planted, occasionally escaping to brushy borders and roadsides. (*810*, *1799*, *1823*)

HYDRANGEACEAE Hydrangea Family

Philadelphus coronarius L. SWEET MOCK-ORANGE. A cultivated shrub that sometimes escapes. A small thicket thrives in a moist roadside southwest of Gilman; it is not close to a dwelling and apparently was not planted. Europe. (*1618*)

Excluded species:

Hydrangea arborescens L. AMERICAN HYDRANGEA. Abandoned plantings of horticultural varieties can persist, as at an old overgrown homesite in Chelsea, but probably never spread. (*2559*)

HYDROPHYLLACEAE Waterleaf Family

Hydrophyllum virginianum L. VIRGINIA WATERLEAF. Characteristic of rich mesic deciduous forests; often abundant. (*1058*)

JUGLANDACEAE Walnut Family

Carya cordiformis (Wang.) K. Koch BITTERNUT HICKORY. Rich moist deciduous forests. Mature trees are occasional to frequent, though seedlings are often quite common. (*814*)

Juglans cinerea L. BUTTERNUT. Bottomland forests and rich upland woods. Becoming increasingly scarce due to butternut canker disease here and through much of its range. (*1014*, *2175*, *2375*, *2478*, *2807*)

Excluded species:

Carya ovata (Miller) K. Koch SHAGBARK HICKORY. Taylor County is north of its range in Wisconsin. I know of one planting of several mature trees which occasionally produce seedlings.

Juglans nigra L. BLACK WALNUT. Though not native this far north in Wisconsin, at least some strains are quite hardy here and planted trees persist and may rarely spread from seed, though this is not documented. (*Brownell 14 UWSP*)

LAMIACEAE (LABIATE) Mint Family

Agastache foeniculum (Pursh) Kuntze BLUE GIANT HYSSOP. One record: a few in dry ground along the Pine Line recreational trail, a former railroad right-of-way. (*1725*)

Agastache scrophulariifolia (Willd.) Kuntze PURPLE GIANT HYSSOP. Known from a bank of the Black River, among rank herbaceous growth bordering a rich bottomland forest, south. (*2123*)

Blephilia hirsuta (Pursh) Benth. WOOD MINT. In damp ground along streams and in moist woods openings; frequent. (*799, 1578, 1773, 2445*)

Galeopsis tetrahit L. var. *bifida* (Boenn.) Lej. & Courtois HEMP-NETTLE. Roadsides and disturbed areas. Eurasia. (*553, 2937*)

Glechoma hederacea L. GROUND-IVY, CREEPING CHARLIE, GILL-OVER- THE-GROUND. Lawns and gardens, woodland borders; a common and often troublesome weed. Eurasia. (*985*)

Hedeoma hispida Pursh FALSE or ROUGH PENNYROYAL. Known from a dry bare gravelly road bank in the CNF. (*2659*)

Lycopus americanus Muhl. AMERICAN WATER-HOREHOUND. Moist to wet places, including stream and pond margins, swamps, and roadsides; fairly common. (*808, 1573, 1662*)

Lycopus uniflorus Michaux NORTHERN BUGLEWEED. Shores, bogs, swamps, wet meadows and thickets, roadsides; common. (*561, 684, 1666, 1935, 2059, 2553, 2644, 2793*)

Lycopus virginicus L. VIRGINIA WATER-HOREHOUND or BUGLEWEED. Our one collection comes from a moist crevice in a low rock outcrop along the Black River. (*2029*)

Mentha arvensis L. (North American plants sometimes considered a separate species, *M. canadensis* L.) FIELD or WILD MINT. Stream margins, ditches, low open ground; occasional to frequent. A native mint. (*1683, 1722, 1732*)

Mentha ×*gracilis* Sole (*M.* ×*gentilis* var. *cardiaca* (Gerarde) Boivin). "On shores of Rib Lake. Frequent." A hybrid of *M. arvensis* × *M. spicata*, a European species. (*Barnes 399 WIS*, 1966.)

Mentha ×*piperita* L. PEPPERMINT. An old record is from roadsides near Rib Lake. The hybrid of *M. aquatica* and *M. spicata*, both of European origin. (*Goessl 3089 MIL*, 1915.)

Mentha ×*villosa* Hudson (*M.* ×*alopecuroides* Hull). Another old collection from the Rib Lake area. A hybrid of *M. suaveolens* Ehrh. × *M. spicata* L., cultivated for its oils. (*Goessl s.n. MIL* and *WIS*, 1915.)

Monarda fistulosa L. WILD BERGAMOT. Well-drained open roadsides, railroads, and old fields; common. (*428*)

Nepeta cataria L. CATNIP. Near dwellings; occasional. Eurasia. (*1282*)

Physostegia virginiana (L.) Benth. FALSE-DRAGONHEAD, OBEDIENT PLANT. Stream and pond margins, damp roadsides, in small colonies; frequent. (*511, 1791, 2176, 2714*)

Prunella vulgaris L. SELF-HEAL, HEAL-ALL. In a variety of habitats, including woodlands, roadsides, neglected lawns, and weedy places; fairly common. We probably have both native and introduced strains. (*324, 580, 1333*)

Pycnanthemum tenuifolium Schrader (*P. flexuosum* (Walter) BSP., misapplied) MOUNTAIN MINT. A few patches are known from dry open roadsides. Probably adventive in our area. (*1920, 2602*)

Pycnanthemum virginianum (L.) T. Durand & B. D. Jackson VIRGINIA MOUNTAIN MINT. One record: a moist old field-type habitat near Stetsonville. (*1708*)

Satureja vulgaris (L.) Fritsch (*Clinopodium vulgare* L.) WILD BASIL, DOGMINT. Moist to dry woods and clearings, stream margins; occasional. (*473, 1397, 1522, 1695*)

Scutellaria galericulata L. MARSH SKULLCAP. Wet meadows, black ash-cedar swamps, marshy shores, stream margins; fairly common. (*327, 1384, 1468, 1648, 1769, 3378, 3431*)

Scutellaria lateriflora L. MAD-DOG SKULLCAP. Wet meadows, low areas in woods, hardwood or mixed swamps, stream margins, damp roadsides; common. (*409*, *481*, *770*, *1543*, *1589*, *1669*, *2060*, *3432*)

Stachys palustris L. MARSH HEDGE-NETTLE. Damp open places. (*700*)

Stachys tenuifolia Willd. COMMON or SMOOTH HEDGE-NETTLE. Most of ours are apparently var. hispida (Pursh) Fern., considered a distinct species by some authors (*S. hispida* Pursh): thickets, bottomlands, roadsides, railroad embankments, woodland edges, often but not always in damp ground; fairly common. (*286*, *429*, *1332*, *1676*, *2460*, *2466*, *2938*). Var. tenuifolia is also known: aspen-birch woods, bottomland forests. (*Christensen 3592 WIS*, 1953.; *Piehl 409 WIS*, 1955.)

Teucrium canadense L. AMERICAN GERMANDER. Locally in bottomlands along the Black River. (*2129*, *2471*)

Additional records from adjacent counties:

Dracocephalum parviflora Nutt. Lincoln, Price: open woods, garden weed.

Leonurus cardiaca L. Lincoln, Marathon: woods, garden weed, river bank. Europe.

Lycopus × sherardii E. S. Steele. Clark, Price: woods, wet meadows and shores. The hybrid of *L. uniflorus* × *L. virginicus*.

Monarda didyma L. Lincoln: wooded slope. Native farther south.

Monarda punctata L. Lincoln, Marathon: dry roadsides and fields.

Scutellaria parvula var. leonardii (Epling) Fern. Chippewa: sandy open field.

LENTIBULARIACEAE Bladderwort Family

Utricularia geminiscapa Benj. HIDDEN-FRUITED BLADDERWORT. Known from one location: the Wood Creek Headwaters Bog in the Taylor County Forest, in shallow water. A state special concern species. (*2104*)

Utricularia gibba L. HUMPED BLADDERWORT. Locally common along boggy shores and on exposed muck in Chelsea and Clarke Lakes. (*2814*, *2817*, *2829*)

Utricularia intermedia Hayne FLAT-LEAVED BLADDERWORT. Locally in quiet water of lakes and ponds. (*1499*, *2055*)

Utricularia vulgaris L. COMMON BLADDERWORT. Quiet water of lakes, ponds, and streams; abundant. (*471*, *1279*, *1388*, *1495*, *2107*, *2362*, *2574*, *2575*, *2590*, *2734*, *2749*, *2750*, *2753*, *2816*)

Additional records from adjacent counties:

Utricularia cornuta Michaux. Lincoln: sandy shore.

Utricularia minor L. Lincoln, Marathon: bog pools, lakes, swamps, wet sand.

Utricularia purpurea Walter. Chippewa, Lincoln: lakes. A state special concern species.

Utricularia resupinata B. D. Greene. Rusk: "Sand Lake," an old record. Of special concern in Wisconsin.

LIMNANTHACEAE False Mermaid Family

Floerkea proserpinacoides Willd. FALSE MERMAID. Locally abundant in damp ground along a small woodland stream in the CNF. The site was discovered by Forest Service botanist Marjorie Brzeskiewicz. (*3262*)

LYTHRACEAE Loosestrife Family

Decodon verticillatus (L.) Elliott var. laevigaetus Torrey & A. Gray SWAMP LOOSESTRIFE or WATER-WILLOW. In marshy places bordering streams or lakes. Very local: known only from Hulls Lake and the South Fork of the Yellow River between Anderson and Mud Lakes, both locations in the CNF. (*2097*, *2783*)

Lythrum salicaria L. PURPLE LOOSESTRIFE. Spreading from cultivation to roadside ditches, wet meadows, marshes, and stream borders. Abundant in places, especially in the Medford and Stetsonville areas. Well-known as a threat to natural wetlands. Eurasia. (*534*, *1603*)

Additional records from adjacent counties:

Lythrum alatum Pursh. Lincoln: moist shore.

Rotala ramosior (L.) Koehne. Chippewa: pond edge, in silt.

MALVACEAE Mallow Family

Abutilon theophrasti Medikus VELVET-LEAF. A weed in cornfields; fairly common. Not mentioned by Seymour (1960) for Lincoln or surrounding counties, this species has apparently spread north in the state in relatively recent times. India. (*727*)

Hibiscus trionum L. FLOWER-OF-AN-HOUR. Found once as a weed inside an old barn foundation. Europe. (*2656*)

Malva moschata L. MUSK MALLOW. Cultivated and occasionally escaping and becoming established along roadsides. Europe. (*1463*, *1848*)

Malva neglecta Wallr. COMMON MALLOW, CHEESES. A weed of gardens and agricultural land, especially in nitrogen-rich ground; occasional. Eurasia and North Africa. (*1643*, *2634*)

Excluded species:

Malva rotundifolia L. DWARF MALLOW. Mapped for the Rib Lake area by Utech (1970), however, no voucher specimen could be found. Known as a weed in Lincoln, Marathon, and Rusk Counties.

MENISPERMACEAE Moonseed Family

Menispermum canadense L. MOONSEED. In woods and thickets along our larger streams, where frequent. Also known from a rich hardwood forest on an ice-walled- lake plain in the CNF. (*502*, *1854*, *3391*)

MENYANTHACEAE Buckbean Family

Menyanthes trifoliata L. BOGBEAN or BUCKBEAN. Frequent in wet, mineral-rich sphagnum bogs and conifer or mixed swamps. (*162*, *2077*)

MOLLUGINACEAE Carpetweed Family

Mollugo verticillata L. CARPETWEED. Sidewalk cracks, gravel pits, and other disturbed, usually dry sandy places; also known from moist sand along a stream; fairly common. Introduced from tropical America. (*820*, *1714*, *1984*, *2497*)

MONOTROPACEAE Indian Pipe Family

Monotropa hypopithys L. PINESAP. One record: fairly common in a young aspen- paper birch-balsam fir woods in the Taylor County Forest. (*2514*)

Monotropa uniflora L. INDIAN PIPE. Moist woods, tamarack swamps, bogs; fairly common, but more so in some years than others. (*398*)

MORACEAE Mulberry Family

Morus alba L. WHITE MULBERRY. Occasionally cultivated, rarely escaping to brushy borders. Native to China, where the leaves are fed to silkworms. (*1801*)

MYRICACEAE Bayberry Family

Comptonia peregrina (L.) J. Coulter SWEET-FERN. Dry open woods; rare. The dry sandy soils preferred by this species are uncommon in Taylor County. (*1502*, *1724*)

Additional records from adjacent counties:

Myrica gale L. Lincoln, Price, Rusk: sandy shores, marshes.

NYCTAGINACEAE Four-o'clock Family

Additional records from adjacent counties:

Mirabilis hirsuta (Pursh) MacMillan. Lincoln: roadside, dry bank. From farther west.

Mirabilis nyctaginea (Michaux) MacMillan. Chippewa, Clark, Lincoln, Rusk: railroads, roadsides, disturbed places. From south and southwest.

NYMPHAEACEAE Water-lily Family

Nuphar variegata Durand (*N. lutea* ssp. *variegata* (Durand) E. O. Beal) YELLOW POND-LILY, SPATTERDOCK. Common in quiet water of lakes, ponds, and streams. (*1147*)

Nymphaea odorata Aiton (including *N. tuberosa* Paine) WATER-LILY. Quiet water of lakes, ponds, and streams; fairly common. Also persistent in very wet bog mats. Environmental factors apparently account for most of the perceived differences between *N. odorata* and *N. tuberosa*; see Voss (1985) for a detailed discussion. (*1364*, *1826*, *2409*)

Additional records from adjacent counties:

Nuphar microphylla (Pers.) Fern. (*N. pumila* (Timm) DC.; *N. lutea* ssp. *pumila* (Timm) E. O. Beal). Lincoln, Rusk: lakes and ponds.

Nuphar ×rubrodisca Morong. Lincoln: sand-bottomed lakes. The hybrid of *N. microphylla* × *N. variegata*.

OLEACEAE Olive Family

Fraxinus americana L. WHITE ASH. Common in rich moist upland woods, usually associated with sugar maple and basswood. (*1541*, *2473*)

Fraxinus nigra Marshall BLACK ASH. Low woods and swamps, in nearly pure stands or, more commonly, with white-cedar, red maple, or other lowland species. Black ash swamps are a rather distinct plant community in our area, found mainly in places where nutrient-rich water moves slowly over or just beneath the ground surface. (*2389*, *2398*)

Fraxinus pennsylvanica Marshall var. subintegerrima (Vahl) Fern. GREEN ASH. Frequent in stream bottoms, especially along the Black River; occasional in upland woods. (*1065*, *2376*, *2383*, *2429*, *2565*)

Syringa vulgaris L. COMMON LILAC. Long persisting from cultivation— occasionally even spreading—around old homesites. Europe. (*310*, *2311*)

ONAGRACEAE Evening-primrose Family

Circaea alpina L. SMALL ENCHANTER'S-NIGHTSHADE. Moist woods, swamps; frequent. (*421*)

Circaea lutetiana L. (*C. quadrisulcata* (Maxim.) Franchet & Savat) ENCHANTER'S-NIGHTSHADE. Rich moist deciduous woods and thickets; locally common. (*366*, *1752*, *2468*)

Epilobium angustifolium L. FIREWEED. Roadsides, woods, and clearings; common, particularly after disturbance (hence, the common name). A white flowered form, known from Taylor County, has been called f. *albiflorum* (Dumort.) Hausskn. (*395*, *1640*)

Epilobium ciliatum Raf. Common in a variety of moist or wet places, tending to be somewhat weedy. (*482*, *1562*, *1679*, *1898*, *2022*)

Epilobium coloratum Biehler. Wet places, especially along streams, and often with the above species. (*1783*, *1892*, *1982*)

Epilobium leptophyllum Raf. Swamps, bog mats, wet meadows, damp disturbed sites; fairly common. (*1875*, *2044*, *2046*, *2721*)

Epilobium palustre L. MARSH WILLOW-HERB. Our only known location for this northern species is a large black ash-cedar-fir swamp near Lost Lake in the CNF. A state special concern species. (*632*)

Gaura biennis L. BIENNIAL GAURA. Collected by Goessl near Rib Lake in 1915 (*3090 MIL*), and more recently found in an old field east of Gilman. A southern species, adventive in northern Wisconsin. (*2683*)

Ludwigia palustris (L.) Elliott FALSE LOOSESTRIFE or WATER-PURSLANE. Wet sandy or muddy shores and stream margins; occasional. (*1961*, *2024*, *2581*, *2840*)

Oenothera biennis L. COMMON EVENING-PRIMROSE. Roadsides, railroads, gravel pits, and other disturbed places; abundant. (*296*, *1607*, *1760*, *1850*, *2533*)

Oenothera parviflora L. EVENING-PRIMROSE. Locally in open gravelly ground. Though often included in an *O. biennis* complex, I find it to be fairly distinctive in the field. (*2556*; *Schlising 708 WIS*, 1957.)

Oenothera perennis L. SUNDROPS. Moist sandy roadsides and stream margins; occasional. (*1467*, *1808*, *2760*, *3322*)

Oenothera pilosella Raf. SUNDROPS. Native south of our area, but commonly cultivated. Known from a steep road bank where it became established after having apparently been dumped with garden waste. (*2547*)

Oenothera villosa Thunb. ssp. villosa EVENING-PRIMROSE. Our one record is from a firebreak in a dry-mesic open field at the Pershing State Wildlife Area. Included in *O. biennis* by some authors, though Raven et al. (1980) consider it distinct. (*Manville s.n. UWSP*, 1974—det. by W. L. Wagner, 1982.)

Excluded species:

Epilobium glandulosum Lehm. NORTHERN WILLOW-HERB. Mapped for the county by Ugent (1962), however, all Taylor County specimens have since been referred to *E. ciliatum*. As currently understood, this is a northern species, apparently collected only a few times in Wisconsin.

Additional records from adjacent counties:

Ludwigia polycarpa Short & Peter. Lincoln: partly submersed in muddy pond.

Oenothera clelandii Dietrich, Raven & W. L. Wagner. Chippewa: dry sandy soil in open field.

Oenothera oakesiana (A. Gray) J. W. Robbins. Marathon: "Rock pile near woods."

OXALIDACEAE Wood-Sorrel Family

Oxalis acetosella L. (*O. montana* Raf.) COMMON WOOD-SORREL. Fairly common in hemlock groves and cedar swamps. (*256*)

Oxalis stricta L. (*O. europaea* Jordan; *O. fontana* Bunge) YELLOW WOOD- SORREL. Lawns, roadsides, weedy places, sometimes woods; common. (*158*, *1255*, *1637*, *1701*)

Additional records from adjacent counties:

Oxalis dillenii Jacq. (*O. stricta* L., misapplied) Marathon: woods, grassy area.

Oxalis violacea L. Chippewa: sandstone cliff, Chippewa Falls.

PAPAVERACEAE Poppy Family

Sanguinaria canadensis L. BLOODROOT. In rich deciduous woods; frequent to fairly common. One of our earliest flowering woodland wildflowers—a true sign of spring. (*855*, *2229*)

Excluded species:

Papaver somniferum L. OPIUM POPPY. Our one known occurrence is from a dump area in a gravel pit and likely not a true escape. Occasionally more or less naturalized elsewhere in North America, however. (*2686*)

PLANTAGINACEAE Plantain Family

Plantago lanceolata L. ENGLISH PLANTAIN. Collected once from a well-drained grassy roadside in the Mondeaux area of the CNF, where it was fairly common. Europe. (*322*)

Plantago major L. COMMON PLANTAIN. Fields, roadsides, lawns, open woodlands, and weedy places in general; abundant. Eurasia. (*272*)

Plantago patagonica Jacq. WOOLLY PLANTAIN. Locally abundant in dry gravel road shoulders, especially in the western half of the county. Native to the Great Plains and known from a few dry prairies in western and southern Wisconsin. (*1299*)

Plantago rugelii Decne. RED-STEMMED PLANTAIN. In similar habitats as *P. major*, and similar in appearance, but apparently less abundant. (*1839*)

Additional records from adjacent counties:

Plantago aristida Michaux. Chippewa, Lincoln: railroad right-of-way, sandy waste ground.

POLEMONIACEAE Phlox Family

Phlox divaricata L. WILD BLUE PHLOX. Rich deciduous woods, riverbottom forests; locally common. (*949*, *2289*, *3266*)

Phlox paniculata L. PERENNIAL, GARDEN, or SUMMER PHLOX. Native farther south, but widely cultivated and occasionally escaped to roadsides in our area. (*622*)

Phlox pilosa L. var. fulgida Wherry PRAIRIE or DOWNY PHLOX. Railroad "prairies" and dry roadsides; very local, but common in a few places. (*343*, *1087*, *1880*)

Phlox subulata L. MOSS-PINK or MOSS PHLOX. Common in the lawn of a church cemetery near Lublin. Native farther south. (*916*)

Polemonium reptans L. JACOB'S-LADDER. Locally in rich bottomland forests and moist upland woods along the Black and Jump Rivers. Also known from an open grassy roadside near the Black River. (*1005*, *1062*, *3030*)

Additional records from adjacent counties:

Collomia linearis Nutt. Lincoln: bank of Wisconsin River; introduced from farther west.

POLYGALACEAE Milkwort Family

Polygala polygama Walter RACEMED MILKWORT. Rare: a few in dry gravelly ground along a railroad track. (*1743*)

Additional records from adjacent counties:

Polygala paucifolia Willd. Lincoln, Marathon: moist woods.

Polygala sanguinea L. Chippewa, Clark: sandy roadsides.

Polygala verticillata L. Chippewa: "Chippewa Falls" an old record.

POLYGONACEAE Smartweed Family

Fagopyrum esculentum Moench BUCKWHEAT. Planted for wildlife and as a temporary cover crop in disturbed areas, sometimes reseeding itself and persisting for a year or two. (*773*)

Polygonum achoreum S. F. Blake. Roadsides and weedy areas; occasional to frequent. Swink & Wilhelm (1994) speculate that this plant may have been a weed around American Indian dwellings. (*1757*)

Polygonum amphibium L. WATER SMARTWEED. Two apparently intergrading varieties, distinct in their extreme forms:

var. emersum Michaux (*P. coccinium* Muhl.). The terrestrial form; local along moist roadsides. Does not produce floating leaves, even when emergent in water. (*729*)

var. stipulaceum N. Coleman (*P. natans* Eaton) Quiet shallow water of lakes and streams; sometimes stranded, as in drained beaver ponds; frequent. Produces floating leaves; flowers only when in water. (*1486*)

Polygonum arenastrum Boreau KNOTWEED. Roadsides, weedy places. Included in *P. aviculare* in older literature. Europe. (*570, 1955, 2939*)

Polygonum arifolium L. HALBERD-LEAVED TEARTHUMB. Rich wet forests and thickets; frequent. (*634, 691, 2075*)

Polygonum aviculare L. KNOTWEED. Roadsides and weedy places; frequent to common. Europe. (*1702*)

Polygonum cespitosum Blume. A weed along the railroad tracks in downtown Medford. This is apparently the first Wisconsin record for the typical variety of this species. East Asia. (*2675*)

Polygonum cilinode Michaux FRINGED BINDWEED. Gravel pits and disturbed upland woods; frequent. (*243, 1321*)

Polygonum convolvulus L. BLACK BINDWEED. Weedy places; occasional. Europe. (*1418, 2654*)

Polygonum cuspidatum Siebold & Zucc. JAPANESE KNOTWEED. Cultivated and rarely escaping to roadsides. Similar to giant knotweed (*Polygonum sachalinense*) and just as difficult to eradicate. Asia. (*1838, 2183*)

Polygonum hydropiper L. WATER-PEPPER. Stream banks and other moist places; sometimes weedy. Native to both Eurasia and North America. (*610, 742, 2680*)

Polygonum hydropiperoides Michaux MILD WATER-PEPPER. Known from a marshy shore of the Mondeaux River below the Mondeaux Dam in the CNF. (*Freckmann 23,485 UWSP*, 1987.)

Polygonum lapathifolium L. NODDING or DOCK-LEAVED SMARTWEED. Moist roadsides, river banks, weedy places; common. We probably have both native and European strains. (*568, 1633, 1980*)

Polygonum pensylvanicum L. PINKWEED or PENNSYLVANIA SMARTWEED. Roadsides, disturbed places; fairly common. (*557, 1548, 1888*)

Polygonum punctatum Elliott SMARTWEED. Streams margins, wet meadows; fairly common. (*611, 1425, 1981, 3434*)

Polygonum sagittatum L. ARROW-LEAVED TEARTHUMB. Common in wet meadows and thickets. (*480*)

Polygonum scandens L. CLIMBING FALSE-BUCKWHEAT. Occasional in disturbed areas. (*586*)

Polygonum virginianum L. JUMPSEED. Locally in rich riverbottom forests. (*503*)

Rumex acetosella L. SHEEP or COMMON SORREL. A common weed of disturbed places. The leaves are edible and have a sour lemony flavor. Europe. (*242*)

Rumex crispus L. CURLY DOCK. Weed of roadsides, fields, and other disturbed places; common. Europe. (*1217*)

Rumex obtusifolius L. BITTER DOCK. Moist logging roads and woods edges; frequent. Europe. (*418*, *2467*)

Rumex orbiculatus A. Gray GREAT WATER DOCK. Wet thickets, marshes, stream margins, bog edges; frequent. (*1877*, *2621*, *3430*)

Rumex salicifolius J. A. Weinm. (*R. mexicanus* Meissner; *R. triangulivalvis* (Danser) Rech. f.). Roadsides and weedy places, frequent. According to Gleason and Cronquist (1991) and others, the name *R. mexicanus* properly belongs to a southwestern tetraploid. (*1638*, *1703*, *2469*)

Rumex verticillatus L. WATER or SWAMP DOCK. Known from a muddy stream margin, in shallow water. (*Damask s.n. UWSP*, 1973.)

Excluded species:

Rheum rhabarbicum L. (*R. rhaponticum* L.) RHUBARB. Commonly cultivated and occasionally found long-persisting at abandoned homesites. I know of no instance where it appears to have spread from its original planting, however. Asia. (*2349*)

Additional records from adjacent counties:

Polygonella articulata (L.) Meissner. Lincoln, Rusk: sandy places.

Polygonum buxiforme Small. Rusk: disturbed open slope.

Polygonum careyi Olney. Lincoln: roadside embankment.

Polygonum ramosissimum Michaux. Price: no habitat data.

Polygonum tenue Michaux. Chippewa: sandy railroad right-of-way.

Rumex maritimus L. Clark, Lincoln: wet ground.

Rumex patientia L. Lincoln, Marathon, Price: weedy places.

PORTULACACEAE Purslane Family

Claytonia virginica L. SPRING-BEAUTY. Rich mesic to damp hardwood forests, often persisting after clearing, even in mowed lawns; common, sometimes abundant. (*876*, *2223*, *2243*)

Portulaca oleracea L. COMMON PURSLANE. A frequent and troublesome weed in rich garden soil; also known from damp ground along a small stream. Sometimes cultivated for its succulent leaves and stems, which are edible raw or cooked. Origin unknown, possibly south Asia, though now cosmopolitan in distribution. (*1531*)

Excluded species:

Portulaca grandiflora Hook. MOSS-ROSE. Found spreading from a planting in Medford into waste ground where seeds had been carried by runoff, persisting only a season. South America. (*2942*)

PRIMULACEAE Primrose Family

Lysimachia ciliata L. FRINGED LOOSESTRIFE. Fairly common in moist woods, thickets, and roadsides. (*378*, *1505*)

Lysimachia lanceolata Walter LANCE-LEAVED LOOSESTRIFE. Occasional in grassy prairie-like areas along railroad tracks in the western part of the county. (*588*, *1684*)

Lysimachia nummularia L. MONEYWORT. One record: in a little-used gravel roadway in a cemetery. Europe. (*1455*)

Lysimachia quadrifolia L. WHORLED LOOSESTRIFE. Upland woods, often at edges or in disturbed places; occasional. (*1511*, *1523*)

Lysimachia terrestris (L.) BSP. SWAMP CANDLES, YELLOW LOOSESTRIFE. Marshy or boggy lake shores, swamps; frequent. (*328*, *1756*, *2788*)

Lysimachia thrysiflora L. TUFTED LOOSESTRIFE. Like the preceding, a wetland species of bogs, swamps, and shores; frequent. (*214*, *1135*, *1259*)

Trientalis borealis Raf. STARFLOWER. In a variety of woods and moisture conditions; abundant. (*130*, *3008*)

Additional records from adjacent counties:

Lysimachia hybrida Michaux. Chippewa: swampy shore of Lake Wissota.

Lysimachia × producta (A. Gray) Fern. Marathon: no habitat data. The hybrid of *L. terrestris* × *L. quadrifolia*.

PYROLACEAE Shinleaf or Wintergreen Family

Chimaphila umbellata (L.) W. Barton var. cisatlantica S. F. Blake PIPSISSEWA, PRINCE'S-PINE. Upland, usually rather dry and rocky, woods; frequent. (*734*, *1256*, *2203*, *2204*)

Moneses uniflora (L.) A. Gray ONE-FLOWERED PYROLA or SHINLEAF. Occasional in cedar swamps. (*769*)

Orthilia secunda (L.) House (*Pyrola secunda* L.) ONE-SIDED PYROLA or SHINLEAF. Cedar swamps, upland mixed woods; frequent. (*766*, *1657*, *2364*, *2535*)

Pyrola asarifolia Michaux PINK PYROLA. Cedar and mixed swamps, upland mixed woods; occasional to frequent. (*1261*, *1591*)

Pyrola chlorantha Sw. (*P. virens* Schreber) GREEN-FLOWERED PYROLA or SHINLEAF. Our only known site for this species is a hemlock grove on a kame-like "island"in a tamarack-spruce bog in the CNF, where fairly common. (*2594*)

Pyrola elliptica Nutt. SHINLEAF. Dry to moist woods; by far our commonest *Pyrola*. (*315*, *403*, *738*, *1466*, *1510*)

Pyrola rotundifolia L. ROUND-LEAVED PYROLA or SHINLEAF. Known only from a moist upland maple woods in the Taylor County Forest, where frequent. (*2517*)

RANUNCULACEAE Buttercup or Crowfoot Family

Actaea pachypoda Elliott (*A. alba* (L.) Miller) DOLL'S-EYES, WHITE BANEBERRY. Rich moist woods; frequent, but less so than the following species. (*156*)

Actaea rubra (Aiton) Willd. RED BANEBERRY. Frequent in rich mesic forests and low woods. Vegetatively very much like *A. pachypoda*. (*969*, *3000*)

Anemone acutiloba (DC.) G. Lawson (*Hepatica acutiloba* DC.) SHARP-LOBED HEPATICA. Rich mesic hardwood forests; frequent to fairly common. I am following *Flora of North America* (1997) in placing this and the following species in *Anemone* rather than *Hepatica*, as in virtually all earlier manuals. *(886)*

Anemone americana (DC.) H. Hara (*Hepatica americana* (DC.) Ker Gawler) ROUND-LOBED HEPATICA. Woods, usually on dryer sites than *A. acutiloba*; fairly common. (*890*, *3225*)

Anemone canadensis L. CANADA ANEMONE. Moist open places, including roadsides, railroads, and stream banks; frequent. Often in dense colonies. (*189*, *1080*, *1114*)

Anemone quinquefolia L. var. quinquefolia WOOD ANEMONE. Common in a wide variety of woods. (*163*, *2238*, *3010*)

Anemone virginiana L. THIMBLEWEED. Frequent in dry to moist woods and clearings, often on slopes. My specimens all appear to be var. *virginiana*, however, two Taylor County specimens at WIS are labeled *Anemone riparia* Fern., a synonym for *A. virginiana* var. *alba* (Oakes) A. Wood. (*1306*, *1345*, *2067*; *Kavanah 2 WIS*, 1971 *Piehl s.n. WIS*, 1955.)

Aquilegia canadensis L. WILD or CANADA COLUMBINE. Frequent in woods and edges, often where disturbance was recent, as in gravel pits and road banks. (*263*, *3270*)

Caltha palustris L. MARSH-MARIGOLD, COWSLIP. Swamps, alder thickets, stream margins, and other wet, often partly shaded, places. Often abundant. (*893*, *2215*, *3222*)

Clematis occidentalis (Hornem.) DC. (*C. verticillaris* DC.) PURPLE CLEMATIS. Dry gravelly open wooded slopes; rare, except for one location near Birch Lake in the CNF where fairly numerous. May persist for years in deep shade, not flowering, until fire or other disturbance releases it. A Wisconsin special concern species. (*1504*, *2249*, *2280*, *2290*, *2397*; *Anderson 16 WIS*, 1947.)

Clematis virginiana L. VIRGIN'S BOWER. Moist roadsides and thickets, swamp margins; frequent. (*522*)

Coptis trifolia (L.) Salisb. GOLDTHREAD. Often abundant in damp mossy woods, especially under hemlock, and in cedar swamps. Occasionally in upland sites under conifers. (*627*, *3238*)

Enemion biternatum Raf. (*Isopyrum biternatum* (Raf.) Torrey & A. Gray) FALSE RUE-ANEMONE. Rich deciduous woods and riverbottom forests; locally abundant. Near the northern edge of its range in Taylor County. (*878*, *989*, *3217*)

Ranunculus abortivus L. SMALL-FLOWERED BUTTERCUP. Rich moist woods and river-bottom forests; fairly common. (147, *904*, *2237*)

Ranunculus acris L. TALL BUTTERCUP. Roadsides, old fields, clearings; abundant. Voss (1985) notes that it is also weedy in its native Europe. (*159*)

Ranunculus aquatilis L. var. diffusus Withering (*R. trichophyllus* Chaix) WHITE WATER-CROWFOOT. Clear streams with gravelly or sandy bottoms; frequent. An old record (*Goessl s.n. WIS*, 1915.) also notes it from Rib Lake. (*1767*, *1959*, *2605*)

Ranunculus flabellaris Raf. YELLOW WATER-CROWFOOT. The terrestrial form is known from wet sandy ground along a quiet backwater of the Black River, south. (*2463*)

Ranunculus hispidus Michaux SWAMP BUTTERCUP. Stream margins, low woods, moist roadsides; frequent. Two varieties, separated primarily by achene characteristics, are possible in our area: var. *caricetorum* (Greene) T. Duncan and var. *nitidus* (Chapman) T. Duncan (*R. septentrionalis* Poiret). However, our specimens, lacking achenes, are undifferentiated here. (*128*, *908*, *914*, *1070*, *3029*, *3240*)

Ranunculus pensylvanicus L. BRISTLY CROWFOOT. Moist or wet meadows and roadsides; occasional. (*302*, *3377*)

Ranunculus recurvatus Poiret HOOKED CROWFOOT or BUTTERCUP. Black ash-cedar swamps, low spots in rich woods, damp forest edges; frequent. (*127*, *3255*, *3353*)

Ranunculus repens L. CREEPING BUTTERCUP. Locally abundant in lawns and low pastures in the Medford area. Also known from a damp shady logging road in the Mondeaux area of the CNF. Europe. (*2332*, *2385*, *2386*, *3316*)

Thalictrum dasycarpum Fischer & Avé-Lall. PURPLE MEADOW-RUE. Marshy or swampy places, wet roadsides; common. (*191*)

Thalictrum dioicum L. EARLY MEADOW-RUE. Rich moist deciduous woods; fairly common. (*381*, *2241*, *3032*)

Excluded species:

Consolida ajacis (L.) Schur (*Delphinium ambiguum* L.) ROCKET LARKSPUR. One record—a garden waste dump near the village of Gilman, but probably not persisting at this site. More or less naturalized through much of the eastern U.S. Europe. (*3417*)

Paeonia lactiflora Pallas PEONY. Persisting at an old abandoned homesite in Hannibal. Rarely mentioned in floras, though it is commonly planted and certainly capable of persisting outside of cultivation for many years. Nowadays, placed in the family Paeoniaceae, but noted here for the sake of convenience. (*1295*)

Additional records from adjacent counties:

Aconitum napellus L. Rusk: along Flambeau River. Undoubtedly a garden escape. Europe.

Anemone cylindrica A. Gray. Chippewa, Lincoln: dry sandy places.

Anemone patens L. Chippewa: sandy upper terrace of Chippewa River.

Ranunculus flammula L. var. reptans (L.) E. Meyer (*R. reptans* L.). Lincoln: sandy shore.

Ranunculus rhomboideus Goldie. Chippewa: dry open sandy and grassy places.

Thalictrum revolutum DC. Rusk: damp roadside bank.

RHAMNACEAE Buckthorn Family

Rhamnus alnifolia L'Her. ALDER-LEAVED BUCKTHORN. Rich wet forests, especially black ash-cedar swamps; frequent. (*1039*, *2078*)

Rhamnus cathartica L. COMMON BUCKTHORN. Escaped to a neglected brushy area bordering an alley in Medford. As yet, rare in Taylor County. Eurasia. (*2847*)

Rhamnus frangula L. GLOSSY BUCKTHORN, ALDER-BUCKTHORN. An introduced shrub or small tree first reported in Taylor County in 1955 by Martin Piehl, (Piehl 1955) who noted it as rare along bog margins and swamps, with this being the northern-most location in Wisconsin. Since then this species has become a threat to native plant communities, invading damp roadsides, railroad right-of-ways, woods, and even bog mats. Especially abundant in the Medford and Gilman areas. Eurasia. (*789*, *1223*, *1490*)

ROSACEAE Rose Family

Agrimonia gryposepala Wallr. AGRIMONY. Old fields, open woods, river banks; fairly common. (*1601*, *1843*, *3413*)

Agrimonia striata Michaux. Old fields and thickets; frequent. *(432, 1842)*

Amelanchier arborea (Michaux f.) Fern. Lightly wooded slopes; occasional. Amelanchiers as a group are commonly called juneberries, serviceberries, or shadbush. (*2213*)

Amelanchier interior Nielsen. Roadsides, gravel pits, woodland margins; frequent. This problematical "species" may actually be a hybrid complex, as noted by Voss (1985) and others. (*935*, *957*, *2220*, *2253*)

Amelanchier laevis Wieg. SMOOTH SHADBUSH or SERVICEBERRY. Dry roadsides, wooded slopes, borders of woods; frequent to fairly common. (*909*, *964*, *2393*)

Amelanchier sanguinea (Pursh) DC. (including *A. huronensis* Wieg.). Dry wooded slopes, roadsides, rock outcrops along rivers; frequent to fairly common. (*951*, *966*, *997*, *1452*, *2266*)

Amelanchier spicata (Lam.) K. Koch (*A. stolonifera* Wieg.). One record: forming a many-stemmed patch in a well-drained grassy roadside. Taylor County lacks the dry sandy soils preferred by this species. (*3243*)

Aronia melanocarpa (Michaux) Elliott (including *A. prunifolia* (Marshall) Rehder, probably a stabilized hybrid) CHOKEBERRY. Shores, bog edges, wet thickets and roadsides; widespread and fairly common. One of our specimens has pubescent leaves, a characteristic associated with *A. prunifolia*. (*1112*, *1482*, *1874*, *3277*)

Crataegus chrysocarpa Ashe (including *C. faxonii* Sarg.). Old fields, along streams. (*754*, *1029*, *1152*)

Crataegus flabellata (Bosc) K. Koch (*C. macrosperma* Ashe; including *C. roanensis* Ashe). In moist ground at the margin of a hemlock-hardwood forest. (*Piehl 308 WIS*, 1955, labeled *C. roanensis* Ashe var. *roanensis*.)

Crataegus mollis (Torrey & A. Gray) Scheele. Floodplain forest along the Black River. (*2186*)

Crataegus punctata Jacq. DOTTED HAWTHORN. Riverbottoms, old fields and pastures, upland woods and borders, roadsides; doubtless our most common hawthorn. (*1077*, *1115*, *1171*)

Filipendula rubra (Hill) Robinson QUEEN-OF-THE-PRAIRIE. Forming patches along moist roadsides. Though the species is likely escaped in Taylor County, neither of our two known occurrences is near a dwelling. (*1581*, *1632*)

Filipendula ulmaria (L.) Maxim. QUEEN-OF-THE-MEADOW. Common along the railroad tracks and in moist open ground in the vicinity of the Black River mill pond on the north side of Medford. Similar to the previous species but with white instead of pink flowers. Cultivated, of Eurasian origin. (*536*)

Fragaria vesca L. WOODLAND STRAWBERRY. Woods and borders, roadsides; probably fairly common. (*132*)

Fragaria virginiana Duchesne WILD STRAWBERRY. Abundant in a variety of open or shaded, dry or moist, habitats. (*907*, *3253*)

Geum aleppicum Jacq. var. strictum (Aiton) Fern. YELLOW AVENS. Moist roadsides and woods; fairly common. (*323*, *377*)

Geum canadense Jacq. WHITE AVENS. Rich moist deciduous woods and thickets; fairly common. (*376*, *1394*, *2446*, *2465*)

Geum laciniatum Murray ROUGH AVENS. Rare or overlooked; our one known population consists of only a few individuals in a black ash-cedar swamp in the Mondeaux area of the CNF. (*3352*)

Geum rivale L. WATER or PURPLE AVENS. Clearings and semi-open places in rich swampy woods; locally frequent. (*1131*, *3036*)

Physocarpus opulifolius (L.) Maxim. NINEBARK. Roadsides and open woods; occasional. Some of our occurrences may represent old plantings. (*809*, *1896*, *2950*)

Potentilla argentea L. SILVERY CINQUEFOIL. Dry gravelly ground; occasional. Europe. (*440*, *1283*)

Potentilla arguta Pursh TALL or PRAIRIE CINQUEFOIL. Dry open places along railroads tracks; occasional. (*835*)

Potentilla flabelliformis Lehm. (*P. gracilis* Hook., misapplied). Collected by Charles Goessl in 1915 along a railroad track near Rib Lake. Native to the western U.S., rarely adventive in the Great Lakes region. (*Goessl s.n. WIS*, 1915.)

Potentilla norvegica L. ROUGH CINQUEFOIL. Road shoulders, gravel pits, and other disturbed places; fairly common. (*269*, *2610*, *2765*)

Potentilla palustris (L.) Scop. MARSH or PURPLE CINQUEFOIL. Lakeshores, marshes, swamps, edges of bogs; frequent. (*329*, *1213*)

Potentilla recta L. SULPHUR CINQUEFOIL. Gravel pits and other dry disturbed sites; frequent. Europe. (*270*)

Potentilla simplex Michaux COMMON or OLD-FIELD CINQUEFOIL. Dry roadsides, gravel pits, other disturbed areas; frequent. (*299*, *1083*)

Prunus americana Marshall WILD PLUM. Forming thickets; local. (*975*)

Prunus nigra Aiton CANADA PLUM. Moist ground along streams, woods and borders; occasional. (*913*, *981*)

Prunus pensylvanica L.f. PIN CHERRY. Roadsides, borders of woods; fairly common. (*956*, *973*, *998*, *1034*, *2217*, *2263*, *3244*)

Prunus serotina Ehrh. WILD BLACK CHERRY. Old fields, roadsides, borders of woods, mesic forests; frequent to fairly common. (*936*, *1109*)

Prunus virginiana L. CHOKE CHERRY. Upland woods and borders, old fields, fencerows, roadsides; common. (*140*, *1009*, *1030*, *2257*, *2298*, *3254*)

Pyrus malus L. (*Malus pumila* Miller) APPLE. The cultivated apple is occasional along roadsides (doubtless from discarded cores) and persistent near abandoned homesites. I found one tall straight-trunked tree growing in a gravelly upland woods and appearing as if native. The fruit of "ditch apples," though usually rather small, is sometimes surprisingly good. Eurasia. (*967*)

Rosa arkansana Porter PRAIRIE ROSE. A specimen from a dry weedy roadside comes closest to this, but the setose-glandular hypanthia may indicate hybrid origin. (*1608*)

Rosa blanda Aiton WILD or SMOOTH ROSE. Our collections are from an open bank of the Black River and the border of a woods, where the stems were nearly 2 m in height. (*1349*, *2827*)

Rosa carolina L. PASTURE ROSE. Mainly in dry open places along railroads, but also at the margins of woods; frequent. (*342*, *646*, *1508*, *2372*, *2558*, *2560*)

Rosa cinnamomea L. (*R. majalis* Herrm.) CINNAMON ROSE. Cultivated and occasionally escaping to roadsides and old fields. Eurasia. (*2384*)

Rosa gallica L. FRENCH ROSE. Formerly much planted. Known from a long- abandoned farmstead, where it was persisting and spreading. Europe. (*3401*)

Rosa multiflora Thunb. MULTIFLORA ROSE. Common along a brushy roadside north of Rib Lake. Though perhaps originally planted at this location, it appears to have spread considerably on both sides of the highway. East Asia. (*2524*)

Rosa rugosa Thunb. JAPANESE ROSE. Cultivated and rarely escaping to roadsides. East Asia. (*1360*)

Rosa spinosissima L. (*R. pimpinellifolia* L.) SCOTCH ROSE. Escaped to a roadside just west of Lublin. Eurasia. (*1210*)

Rubus allegheniensis Porter COMMON BLACKBERRY. Dry roadsides, upland woods, old fields and clearings; fairly common. (*1192*, *1193*, *1550*, *2390*)

Rubus canadensis L. SMOOTH BLACKBERRY. Gravel pits, clearings, woods, in moist or dry soil; frequent. (*1287*, *2516*, *2557*)

Rubus flagellaris Willd. (*R. plicatifolius* Blanchard; including *R. recurvicaulis* Blanchard) NORTHERN OR COMMON DEWBERRY. A collection from dry sterile sand in an old sand pit, and keying to *R. recurvicaulis* in Gleason & Cronquist (1991), is placed here. (*2849*)

Rubus hispidus L. (including *R. plus* Bailey) SWAMP DEWBERRY. Wet meadows, swamps, bog edges; fairly common. (*2411*, *2430*, *2502*; *Iltis 20,918 MIL*, 1963— annotated "*R. plus*" by A. M. Fuller.)

Rubus idaeus L. var. strigosus (Michaux) Maxim. (*R. strigosus* Michaux) WILD RED RASPBERRY. Roadsides, woods and clearings, thickets, open fields; abundant. (*1203*)

Rubus occidentalis L. BLACK RASPBERRY. One small patch in well-drained gravelly soil along a remote logging road in the CNF. Also observed in a thicket on an upper bank of the Jump River. (*1749*)

Rubus parviflorus Nutt. THIMBLEBERRY. Locally in gravelly upland woods and borders. One of the famous (at least among botanists) Great Lakes "western disjuncts" (Marquis & Voss 1981), here at the southern edge of its range in this part of Wisconsin. (*252*, *1891*, *2392*, *2715*)

Rubus pensilvanicus Poiret (*R. frondosus* Bigelow; including *R. abactus* Bailey) PENNSYLVANIA BLACKBERRY. Collected from a low woods of paper birch, balsam poplar, fir, and red maple in the CNF. (*Gale & Struick s.n. WIS*, 1957— annotated "*R. abactus* complex" by A. M. Fuller.)

Rubus pubescens Raf. DWARF RASPBERRY. Abundant in damp woods and swamps. (*136*, *3256*)

Rubus setosus Bigelow (including *R. regionalis* Bailey, *R. superioris* Bailey, and *R. vermontanus* Blanchard) BRISTLY BLACKBERRY. In a variety of habitats, including dry open roadsides, damp woods, and bogs; frequent to fairly common. (*387*, *1318*, *1330*, *1517*, *2420*; *Gale & Struick s.n. WIS*, 1957—annotated by A. M. Fuller: "comes closest to *R. regionalis*.")

Sorbaria sorbifolia (L.) A. Braun FALSE SPIRAEA. Occasionally escapes cultivation. Once established, this species is capable of forming extensive patches in rich mesic woods, even dominating the shrub and ground layers in a large section of one maple-basswood woods. East Asia. (*1623*, *1625*, *1912*)

Sorbus americana Marshall AMERICAN MOUNTAIN-ASH. Wet thickets and swamps, rocky upland woods; occasional. Seedlings are frequently encountered in swamps. (*999*, *2577*)

Sorbus aucuparia L. EUROPEAN MOUNTAIN-ASH. Spontaneous in a brushy old pasture on the Kuse farm near Medford. Europe. (*1800*)

Sorbus decora (Sarg.) C. Schneider SHOWY MOUNTAIN-ASH. My one collection is from a lone tree in a wet alder-sedge meadow, seemingly the wrong habitat. Also known from a woods on the south shore of Rib Lake. (*1153*; *Anderson 183 WIS*, 1947.)

Spiraea alba Duroi MEADOWSWEET. Wet meadows, old fields, roadsides; common. (*386*, *1803*)

Spiraea tomentosa L. STEEPLEBUSH, HARDHACK. Swamps, wet meadows, roadsides; common. (*1609*)

Excluded species:

Crataegus calpodendron (Ehrh.) Medikus. Piehl (1955) notes it from a brushy pasture, however, no specimen could be located.

Crataegus pruinosa (Wendl.) K. Koch. Listed by Piehl (1955) from thickets and pastures. No specimen located.

Spiraea × *vanhouttei* (Briot) Carr. BRIDAL WREATH. Not known as an escape in Taylor County, but plantings are long- persisting, as in old cemeteries. (*1111*)

Additional records from adjacent counties:

Agrimonia pubescens Wallr. Rusk: shady roadside in oak-maple woods.

Chaenomeles lagonaria Koidz. Lincoln: "wild" in woods.

Crataegus fluviatilis Sarg. Clark, Lincoln, Price: sandy soil near streams; specimens at WIS. I can find no reference to this "species" in recent manuals.

Crataegus succulenta Schradern (incl. *C. macrantha* Lodd.). Chippewa, Rusk: roadsides.

Geum macrophyllum Willd. Chippewa: edge of moist woods in rich soil. A state special concern species.

Geum triflorum Pursh. Chippewa: dry prairies and roadsides.

Potentilla intermedia L. Chippewa, Marathon: weed in sandy soil.

Potentilla tridentata Sol. Clark, Lincoln, Marathon: sandy places.

Prunus pumila L. Chippewa, Lincoln, Marathon: dry woods, sandy river banks.

Rosa acicularis Lindley. Price: " West of Round Lake."

Rosa palustris Marshall. Clark, Marathon: wet roadsides.

Waldsteinia fragarioides (Michaux) Tratt. Lincoln, Marathon, Price, Rusk: woods, riverbank, firelane.

RUBIACEAE Madder Family

Galium aparine L. CLEAVERS. Locally common in rich bottomland forests along the Black River, south. (*1050*)

Galium asprellum Michaux ROUGH BEDSTRAW. Common in damp woods and forest clearings, where the rough stems readily attach themselves to the pants legs of botanists and other wayfarers. (*2470*, *2538*)

Galium boreale L. NORTHERN BEDSTRAW. Locally common in moist prairie-like areas along railroad tracks and at the margins of the Jump River. (*653*, *1200*, *1587*, *1830*, *3319*)

Galium lanceolatum Torrey LANCE-LEAVED WILD LICORICE. Locally in upland deciduous woods. (*2542*)

Galium mollugo L. WHITE BEDSTRAW, WILD MADDER. Rare to occasional in grassy roadsides, forming small showy patches of upright stems. Europe. (*1956*, *2627*)

Galium obtusum Bigelow. Locally in moist open or wooded floodplains along the Black and Jump Rivers. (*2380*, *2844*, *3321*)

Galium tinctorium L. A common species of wet meadows and thickets, marshy shores, swamps, and low spots in woods. (*331*, *1387*, *1650*, *1742*, *1934*, *2387*, *2395*, *2414*, *2501*, *2646*, *2940*, *3384*)

Galium trifidum L. Known from a sedge meadow in the Taylor County Forest. (*2722*)

Galium triflorum Michaux SWEET-SCENTED BEDSTRAW. Mainly a species of rich mesic forests, but also in dryer woods and black ash-cedar swamps; common. (*369*, *1479*, *2363*, *2526*, *2724*, *3317*)

Mitchella repens L. PARTRIDGE-BERRY. Fairly common in a variety of upland woods. (*317*, *932*)

Additional records from adjacent counties:

Galium concinnum Torrey & A. Gray. Chippewa, Clark: deciduous woods.

Houstonia longifolia Gaertner. Chippewa, Lincoln: sandy woods, roadsides, and open places.

RUTACEAE Rue Family

Zanthoxylum americanum Miller (*Xanthoxylum*, in some manuals) PRICKLY- ASH. Locally common in moist ground along the Yellow and Black Rivers, and perhaps other large streams as well; often forming thickets. (*950*, *1174*)

SALICACEAE Willow Family

Populus alba L. WHITE or SILVER POPLAR. Cultivated and frequently spreading to roadsides by root suckers. Eurasia. (*1105*)

Populus balsamifera L. BALSAM POPLAR. Cut-over, often damp, woods; locally common. (*1262*, *1832*)

Populus deltoides Marshall COTTONWOOD. Occasional along the Black River and in open disturbed places, such as old gravel pits. Sometimes cultivated. (*1068*, *2689*)

Populus grandidentata Michaux LARGETOOTH or BIGTOOTH ASPEN. This and the following species are relatively short-lived trees that colonize disturbed sites and persist in mature forests; abundant, but less so than *P. tremuloides*. (*1010*)

Populus tremuloides Michaux QUAKING ASPEN. Thrives on many soil types, from wet to dry. Invades burned, cut-over, or otherwise disturbed places and, like *P. grandidentata*, is often maintained through clearcutting; very abundant. (*1007*)

Salix alba L. WHITE WILLOW. An introduced species occasionally found on shores. Eurasia. (*1484*)

Salix babylonica L. WEEPING WILLOW. Large tree-size weeping willows are occasionally found persisting or escaping from cultivation. These may represent various hybrids and not true *S. babylonica*. Asia. (*987*)

Salix bebbiana Sarg. BEAKED WILLOW. Common in a variety of wet to dry places. May attain small tree size. (*897*, *978*, *1023*, *1093*, *1121*)

Salix discolor Muhl. PUSSY WILLOW. Wet roadsides, thickets, swamps; common. (*848*, *852*)

Salix eriocephala Michaux HEART-LEAVED WILLOW. Streambottoms, wet disturbed places. (*873*, *928*)

Salix exigua Nutt. (*S. interior* Rowlee) SANDBAR WILLOW. Sand and gravel bars in large streams and other wet, often sandy, places; locally common. (*1162*, *1907*)

Salix fragilis L. CRACK WILLOW. Commonly cultivated, sometimes escaping to wet roadsides and other wet places. Eurasia. (*898*, *934*, *939*, *946*)

Salix humilis Marshall UPLAND or PRAIRIE WILLOW. Roadsides and thickets, often in rather dry situations; common. (*849*, *853*, *881*, *1013*, *2370*)

Salix lucida Muhl. SHINING WILLOW. Wet meadows, thickets, bogs; common. (*1022*, *1033*, *1108*, *1276*, *1460*)

Salix nigra Marshall BLACK WILLOW. Borders of ponds and lakes, along drainageways; occasional to frequent. (*1347*, *1483*)

Salix pedicellaris Pursh BOG WILLOW. Bogs and sedge meadows. (*1385*)

Salix pentandra L. BAY-LEAVED or LAUREL WILLOW. Cultivated and occasionally escaping to damp places. Europe. (*1146*)

Salix petiolaris J. E. Smith MEADOW WILLOW. In a variety of moist to wet places. (*896*, *1120*)

Salix pyrifolia Andersson BALSAM WILLOW. Bogs, conifer swamps, sedge meadows, wet roadsides; frequent. (*938*, *961*, *962*, *963*, *1071*, *1363*, *2419*)

Excluded species:

Salix cordata Michaux. Piehl (1955) reported this species from moist areas and uplands. The plant he was referring to is almost certainly *S. eriocephala*, a species with a complicated taxonomic history. *S. cordata* is endangered in Wisconsin and restricted to Lake Michigan sand dunes.

Additional records from adjacent counties:

Salix candida Fluegge. Marathon: bog.

Salix myricoides Muhl. (*S. glaucophylloides* Fern.). Lincoln: "Scott Creek."

Salix sericea Marshall. Clark: "Neillsville."

Salix serissima (L. H. Bailey) Fern. Chippewa, Price: bogs, sedge meadows.

Salix ×*rubens* Schrank (*S. alba* × *S. fragilis*). Clark: drainageway.

SANTALACEAE Sandalwood Family

Comandra umbellata (L.) Nutt. BASTARD-TOADFLAX. Rare or extirpated; known from a dryish railroad "prairie," south, but the site was herbicided in 1997. Taylor County generally lacks the dry sandy habitats preferred by this species. (*1091*)

SARRACENIACEAE Pitcher-plant Family

Sarracenia purpurea L. PITCHER-PLANT. In sphagnum bogs; frequent. Most of our bogs have at least a few of these interesting carnivorous plants. (*687*, *2108*, *2756*, *2790*, *2800*, *2812*)

SAXIFRAGACEAE Saxifrage Family

Chrysosplenium americanum Schwein. GOLDEN SAXIFRAGE. In the wettest parts of cedar or black ash swamps; also in cool springy places and in shade along streams; often abundant in dense masses. (*829*, *883*, *2941*, *3263*)

Heuchera richardsonii R. Br. PRAIRIE ALUM-ROOT. Our only known location is along a railroad track, south, where a small population is associated with numerous prairie species. (*1198*)

Mitella diphylla L. BISHOP'S CAP, MITERWORT. Common in rich deciduous woods. (*154*, *2232*, *3002*)

Mitella nuda L. NAKED MITERWORT. Primarily in mossy cedar swamps, where it is often common. Rarely in moist uplands under hemlock or white pine. (*1043*, *3252*)

Penthorum sedoides L. DITCH STONECROP. In mud or sand along streams and in other, often lightly shaded, wet areas, especially where there has been disturbance; occasional to frequent. Sometimes placed in the family Penthoraceae. (*1635*, *1768*, *1772*, *3403*)

Saxifraga pensylvanica L. SWAMP SAXIFRAGE. Rich cedar and black ash swamps, alder thickets; frequent. The tall flowering stems are often heavily browsed by deer. (*255*, *3260*)

SCROPHULARIACEAE Figwort Family

Agalinis tenuifolia (Vahl) Raf. (*Gerardia tenuifolia* Vahl) SLENDER FALSE FOXGLOVE. Moist gravelly roadsides, gravel pits, sandy soil along streams; frequent. (*608*, *1866*, *1979*, *2032*, *2768*)

Castilleja coccinea (L.) Sprengel INDIAN PAINTBRUSH, PAINTED CUP. Abundant along roads and in moist open grasslands in the North Unit of the Pershing State Wildlife Area. Also collected from a grassy roadside near Gilman. (*1301*, *2367*)

Chaenorrhinum minus (L.) Lange DWARF SNAPDRAGON. Occasional in railroad track ballast. Europe. (*781*, *1740*)

Chelone glabra L. TURTLEHEAD. Damp open roadsides, stream margins, wet meadows, black ash swamps; frequent. (*523*)

Gratiola neglecta Torrey CLAMMY HEDGE HYSSOP. Wet muddy or sandy places bordering streams and gravel pit ponds; fairly common. (*1320*, *1571*, *1741*, *2118*)

Linaria vulgaris Miller BUTTER-AND-EGGS. Fairly common in dry gravelly ground along roads and railroads and in gravel pits. Europe. (*385*)

Lindernia dubia (L.) Pennel FALSE PIMPERNEL. Wet sandy or muddy places along streams and in gravel pits. (*1570*, *2611*)

Melampyrum lineare Desr. var. americanum (Michaux) Beauverd COW-WHEAT. Locally common in dryish woods. (*2016*, *2051*)

Mimulus glabratus HBK. YELLOW MONKEY-FLOWER. Our only record is from a wet springy area along Silver Creek. (*1720*)

Mimulus ringens L. MONKEY-FLOWER. Wet meadows, semi-open swamps, stream margins, shores, damp roadsides; fairly common. (*384*, *479*, *1442*, *1793*, *2064*)

Pedicularis canadensis L. WOOD BETONY, LOUSEWORT. Dry open places along roads and railroads, dry open woods; local, mainly southwest. (*1082*, *1086*, *1831*)

Penstemon digitalis Nutt. WHITE or FOXGLOVE BEARD-TONGUE. Locally in open prairie-like areas along the Jump River, in the Pershing Wildlife Area, and along the Pine Line recreational trail (a former railroad right-of-way). (*1300*, *3364*)

Scrophularia lanceolata Pursh FIGWORT. Moist forest edges and openings, stream margins; frequent. (*375*, *467*, *2135*)

Verbascum thapsus L. COMMON MULLEIN. Gravel pits, newly constructed roadsides, recently logged forests, and other disturbed sites; fairly common. Europe. (*295*)

Veronica longifolia L. GARDEN or LONG-LEAVED SPEEDWELL. A cultivated species occasionally escaped to roadsides. Europe. (*1897*, *1945*)

Veronica officinalis L. COMMON SPEEDWELL. Collected from a gravelly skid road through a severely logged upland hardwood industrial forest north of Rib Lake. Europe. (*2207*, *2527*)

Veronica peregrina L. var. xalapensis (HBK.) St. John & F. A. Warren PURSLANE SPEEDWELL. In a variety of weedy disturbed places; frequent. (*1208*, *1328*, *1737*, *3276*)

Veronica persica Poiret BIRD'S-EYE SPEEDWELL. One record: a garden weed in Medford. Southwest Asia. (*2248*)

Veronica scutellata L. MARSH SPEEDWELL. Partly shaded places along major streams. (*1592*, *2462*)

Veronica serpyllifolia L. THYME-LEAVED SPEEDWELL. Lawns, roadsides, moist woods; fairly common. Europe. (*314*, *982*, *1444*, *2255*)

Veronicastrum virginicum (L.) Farw. CULVER'S ROOT. Fairly common along a moist grassy roadside in the CNF. Also known from an open area near the railroad tracks in Stetsonville. (*1707*, *2148*, *2662*)

Additional records from adjacent counties:

Agalinis paupercula (A. Gray) Britton. Chippewa: lakes shores.

Gratiola aurea Pursh (*G. lutea* Raf.). Chippewa, Lincoln: sandy or muddy lakeshores.

Linaria canadensis (L.) Chaz. (*Nuttallanthus canadensis* (L.) D. A. Sutton). Clark: "White Mound."

Veronica americana (Raf.) Schwein. (*V. beccabunga* L. var. *americana* Raf.). Lincoln: wet shady places.

SOLANACEAE Nightshade Family

Leucophysalis grandiflora (Hook.) Rydb. (*Physalis grandiflora* Hook.) LARGE- FLOWERED GROUND-CHERRY. Discovered in 1997 in bare ground along a hardwood forest fringe previously killed by beaver flooding, appearing during early recolonization of the site by terrestrial plants after the dam was removed. The location was at the edge of an ice-

walled-lake plain a few miles northwest of Perkinstown in the CNF. Before the thirty or so plants could set much fruit, they were severely browsed, most likely by deer. By the next year the site had grown up considerably and only about three plants reappeared. The occurrence here of this showy and little-known species is one of the few documented in the state in recent decades, underscoring its current scarcity. An older county collection is from "cleared land" near Rib Lake. A Wisconsin special concern species, though should be reconsidered for threatened or endangered listing. (*3295 WIS & CNF, Anderson 82 WIS*, 1947.)

Physalis heterophylla Nees CLAMMY GROUND-CHERRY. Old fields and old pastures, in well-drained ground; local. (*1302, 1863*)

Physalis virginiana Miller VIRGINIA GROUND-CHERRY. Dry sites along railroad tracks and in open grasslands; local. (*1577, 1677, 1698*)

Solanum dulcamara L. BITTERSWEET NIGHTSHADE. Brushy borders, thickets, and neglected areas near dwellings; occasional. Eurasia. (*747*)

Solanum ptychanthum Dunal (*S. nigrum* L.; *S. americanum* Miller, misapplied) BLACK NIGHTSHADE. Weedy places and waste ground; along new logging roads; occasional. (*818, 1992*)

Additional records from adjacent counties:

Petunia hybrida Vilm. Chippewa: open area below a dam. The garden petunia. South America.

Physalis longifolia Nutt. Marathon: roadside.

THYMELAEACEAE Mezereum Family

Dirca palustris L. LEATHERWOOD. Frequent in rich moist deciduous woods. (*1538, 2209*)

TILIACEAE Linden Family

Tilia americana L. BASSWOOD, AMERICAN LINDEN. Common in rich mesic woods, often associated with sugar maple. (*1240*)

ULMACEAE Elm Family

Celtis occidentalis L. HACKBERRY. Very local in bottomland forests along the Black River, south. Costello (1933) also noted it from the Goodrich area, perhaps from along the Rib River. (*2142, 2835*)

Ulmus americana L. AMERICAN ELM. Riverbottom forests, moist woods, roadsides; formerly abundant and still fairly common, though large mature trees are becoming scarce due to Dutch elm disease. (*1001, 1003, 1055, 1348, 2455, 2566*)

Ulmus pumila L. SIBERIAN ELM. Cultivated and escaping to roadsides; occasional. Asia. (*1829, 2147, 2199*)

Ulmus rubra Muhl. SLIPPERY or RED ELM. Rich bottomlands along the Black River, south. A 1948 study of a rich old growth hemlock-hardwood forest north of Rib Lake reported that slippery elm was surprisingly common (Anderson 1948), however, no voucher specimen could be located. (*2836*)

Ulmus thomasii Sarg. ROCK or CORK ELM. Rich deciduous woods, riverbottom forests; occasional to frequent. (*1909, 2837*)

URTICACEAE Nettle Family

Boehmeria cylindrica (L.) Sw. FALSE NETTLE. Stream banks, bottomlands, shores; frequent. (*1593, 1624, 2731, 2842*)

Laportea canadensis (L.) Wedd. WOOD NETTLE. Rich deciduous forests, hardwood swamps, bottomlands; abundant in places. (*444*)

Pilea fontana (Lunell) Rydb. CLEARWEED. Low woods, damp places along streams; frequent. (*2030, 2083, 2119*)

Pilea pumila (L.) A. Gray CLEARWEED. Similar in appearance to the above species and in similar habitats; frequent. (*745, 2009*)

Urtica dioica L. ssp. gracilis (Aiton) Selander STINGING NETTLE. Wet meadows, thickets, and roadsides, borders of streams, weedy places, moist to wet woods, especially where disturbance has occurred; often in rich soil; common. (*419, 1443*)

VALERIANACEAE Valerian Family

Valeriana officinalis L. GARDEN-HELIOTROPE or GARDEN VALERIAN. One record: a robust individual in a moist open roadside bordering an old field. Eurasia. (*1619*)

VERBENACEAE Vervain Family

Phryma leptostachya L. LOPSEED. Frequent in rich deciduous woods. (*370*, *674*, *2475*)

Verbena hastata L. BLUE VERVAIN. Moist roadsides, meadows, marshes, old fields; common. (*390*)

Verbena urticifolia L. WHITE VERVAIN. Woodland borders, especially after disturbance; occasional. (*2014*)

Excluded species:

Verbena ×engelmannii Moldenke. A partially fertile hybrid of *V. hastata* × *V. urticifolia* mapped for the Rib Lake area in Tans and Iltis (1979), however, no voucher specimen could be located.

Additional records from adjacent counties:

Verbena bracteata Lagasca & Rodriguez. Chippewa, Lincoln, Marathon: roadsides, sandy open ground, sidewalk cracks in downtown Wausau.

Verbena stricta Vent. Chippewa, Lincoln: roadsides, dry open sandy places.

VIOLACEAE Violet Family

Viola adunca Sm. SAND or HOOKED VIOLET. A few small colonies grow in a dryish mixed forest atop the Mondeaux Esker in the CNF. (*3269*, *3274*)

Viola blanda Willd. (*V. incognita* Brainerd) SWEET WHITE VIOLET. Moist mixed woods, mossy logs and hummocks in cedar swamps; fairly common. (*929*, *955*, *2250*, *2265*, *2268*, *3228*)

Viola canadensis L. CANADA VIOLET. Our one record for this mesic woodland species is an old specimen at WIS labeled only "Goodrich, Wisc." Since Goodrich is close to the Lincoln and Marathon County lines, I rather tentatively include it here, though we are certainly within its range and have suitable habitat. (*Cheney 3171 WIS*, 1894.)

Viola cucullata Aiton MARSH BLUE VIOLET. Damp ground along streams, wet meadows, roadside ditches, mixed swamps, shores, lawns; fairly common (*983*, *1004*, *1130*, *1588*, *2012*, *2252*, *2254*, *2300*, *3236*)

Viola labradorica Schrank (*V. conspersa* Reichb.) AMERICAN DOG VIOLET. Moist to dryish woods—especially along woodland trails and at edges, lawns; fairly common. Ballard (1994) has combined *V. labradorica* and *V. conspersa* as northern and southern extremes of one species. (*915*, *919*, *960*, *1042*, *2219*)

Viola macloskeyi F. E. Lloyd (*V. pallens* (Banks) Brainerd) SMOOTH WHITE VIOLET. Fairly common in bogs, black ash-cedar swamps, wet spots in deciduous woods, lawns. (*984*, *1038*, *1143*, *2049*, *2277*, *2302*, *2331*, *2751*, *2778*, *2936*, *3239*)

Viola novae-angliae House NEW ENGLAND VIOLET. Rare: one small population in a dry open woods near Birch Lake in the CNF. Recently delisted in the state. (*2216*)

Viola pubescens Aiton. Two fairly distinct varieties:

var. pubescens DOWNY YELLOW VIOLET. In rather dry woods; occasional. (*930*)

var. scabriuscula Schwein. (*V. eriocarpa* Schwein.; *V. pensylvanica* Michaux, misapplied?) SMOOTH YELLOW VIOLET. Fairly common in rich mesic deciduous or mixed woods and bottomland forests. (*902*, *3220*, *3273*)

Viola renifolia A. Gray KIDNEY-LEAVED VIOLET. Our only collection is from a white-cedar swamp in the Mondeaux area of the CNF, where it was uncommon. (*3354*)

Viola selkirkii Goldie GREAT-SPURRED VIOLET. Rich hemlock-hardwood forests; occasional. (*884*, *3213*)

Viola sororia Willd. COMMON or WOOLLY BLUE VIOLET. Rich moist deciduous forests, woodland edges, occasionally in swamps or lawns; fairly common. (*901*, *910*, *918*, *991*, *995*, *2287*, *2321*, *3219*)

Viola tricolor L. JOHNNY-JUMP-UP. Cultivated and occasionally escaping to garden borders and dumps; can be somewhat weedy in gardens where formerly grown. Europe. (*1796*, *2685*)

Additional records from adjacent counties:
Viola lanceolata L. Chippewa, Lincoln: sandy shores, bogs.
Viola nephrophylla Greene. Chippewa: creek bottom, pasture near pond.
Viola odorata L. Lincoln: lawn weed.
Viola pedata L. Chippewa: dry sandy places.
Viola sagittata Aiton. Clark, Chippewa: rocky or sandy places.

VISCACEAE Mistletoe Family

Arceuthobium pusillum Peck DWARF MISTLETOE. Parasitic on black spruce; common in some bogs. As noted by Voss (1985), fire was formerly a natural means of control, hence the species may be much more common now than in the past. (*1165*, *2208*)

VITACEAE Grape Family

Parthenocissus inserta (A. Kerner) Fritsch (*P. vitacea* (Knerr) A. Hitchc.) VIRGINIA or THICKET CREEPER, WOODBINE. Woods, thickets, fencerows, along railroads, climbing on the stone walls lining the Black River in Medford; frequent to fairly common. (*1006*, *1408*)

Parthenocissus quinquefolia (L.) Planchon VIRGINIA CREEPER, WOODBINE. Thickets, edges of moist woods; occasional. Perhaps only an escape in our area. (*1048*, *2544*)

Vitis riparia Michaux RIVER-BANK or FROST GRAPE. Moist woods and thickets, especially along our larger streams; frequent. (*514*, *519*)

Class Liliopsida — *Monocots*

ACORACEAE Sweet Flag Family

Acorus americanus (Raf.) Raf. SWEET FLAG. Marshy stream edges and lakeshores; occasional. (*1076*)

ALISMATACEAE Water-plantain Family

Alisma subcordatum Raf. (*A. plantago-aquatica* L. var. *parviflorum* (Pursh) Torrey) WATER-PLANTAIN. In shallow water along the edges of streams, ponds, and ditches, or where lowered water levels have exposed wet open mud or gravel. (*2459*)

Alisma triviale Pursh (*A. plantago-aquatica* L. var. *americanum* Roemer & Schultes) WATER-PLANTAIN. In similar habitats as *A. subcordatum* and similar in appearance, but with somewhat larger flowers and achenes. (*603*)

Sagittaria cristata Engelm. (*S. graminea* var. *cristata* (Engelm.) Bogin). Lakeshores and stream edges. Very similar to *S. graminea*, and often considered a variety of it. (*1729*; *Hansen 70 WIS*, 1971.)

Sagittaria cuneata Sheldon ARUM-LEAVED ARROWHEAD. Shoreline of the Mondeaux Flowage. (*Hansen 165 UWL*, 1971.)

Sagittaria graminea Michaux GRASS-LEAVED ARROWHEAD. Collected from exposed sand at the edge of Pine Creek. (*1424*)

Sagittaria latifolia Willd. COMMON ARROWHEAD or WAPATO. A common species of shores, stream edges, marshes, and ditches. (*513*, *2457*)

Sagittaria rigida Pursh SESSILE-FRUITED ARROWHEAD. Lakeshores, in shallow water. Known from Richter Lake and the Mondeaux Flowage. (*2703*)

ARACEAE Arum Family

Arisaema dracontium (L.) Schott GREEN DRAGON. Rare; known only from a rich floodplain forest along the Black River, south. (*2382*)

Arisaema triphyllum (L.) Schott (*A. atrorubens* (Aiton) Blume) JACK- IN-THE-PULPIT. Rich moist woods, riverbottom forests, swamp forests; fairly common. (*149*, *2227*)

Calla palustris L. WILD CALLA or WATER-ARUM. Margins of lakes and ponds, wetter parts of bogs, swamps, often in shallow water; fairly common. (*126*)

Symplocarpus foetidus (L.) Nutt. SKUNK-CABBAGE. Hardwood and mixed swamps, alder thickets, springy places; locally common. (*872*, *1125*)

COMMELINACEAE Spiderwort Family

Tradescantia ohiensis Raf. SPIDERWORT. One known occurrence: along a railroad track in Gilman. (*1630*)

Additional records from adjacent counties:

Commelina diffusa Burman. Lincoln, Rusk: weed of gardens and waste places. Probably introduced from the Old World. Its inclusion here based on specimens at WIS.

CYPERACEAE Sedge Family

Bulbostylis capillaris (L.) C. B. Clarke HAIR SEDGE. Locally common in the gravel road shoulder along County Highway D in the northwestern part of the CNF. (*2763*)

Carex albursina Sheldon WHITE BEAR SEDGE. Rich deciduous woods; local. (*477*)

Carex annectans (Bickn.) Bickn. (*C. vulpinoidea* var. *ambigua* F. Boott). Moist open grassy places. (*1314*, *2545*)

Carex aquatilis Wahlenb. Shores and stream margins. (*304*, *1485*)

Carex arctata W. Boott. A common species of deciduous and hemlock-hardwood forests. Sometimes in more open habitats, such as rock outcrops and gravel pits. (*173*, *224*, *297*, *308*, *1324*, *1779*, *3282*)

Carex assiniboinensis W. Boott ASSINIBOINE SEDGE. Rarely occurring on the tops of steep undercut river banks along the Rib and Black Rivers; quite noticeable in this situation because of its habit of producing long stolons that hang down over the bank. A state special concern species. (*1774*, *2127*)

Carex bebbii (L. Bailey) Fern. BEBB'S SEDGE. Known from a shore of the Mondeaux Flowage and to be expected from shores and stream margins elsewhere. (*Hansen 44 WIS*, 1971.)

Carex bromoides Willd. Moist woods and swamps; frequent. (*192*, *1231*, *1400*, *3308*)

Carex brunnescens (Pers.) Poiret. Low woods and meadows; fairly common. (*193*, *210*, *1403*, *1670*, *2188*, *3290*, *3313*, *3358*)

Carex canescens L. Wet bogs, sedge meadows, marshes; fairly common. (*220*, *1374*, *1386*, *2348*, *2394*, *3301*)

Carex cephaloidea (Dewey) Dewey (*C. sparganioides* var. *cephaloidea* (Dewey) Carey). Locally in bottomlands along the Black River, south. (*1059*, *2449*)

Carex cephalophora Willd. Our only record is from a dry hilly overgrown pasture near the Jump River. (*1856*)

Carex chordorrhiza L. f. Sphagnum bogs; frequent. (*1164*, *1352*)

Carex communis L. Bailey. Common in upland deciduous or mixed woods. Occasional in pine and spruce plantations and dryer spots in swamps. (*168*, *169*, *208*, *238*, *316*, *318*, *1379*, *1389*, *1472*, *2282*, *2361*, *2495*, *3281*, *3283*, *3288*, *3289*)

Carex comosa F. Boott. Lakeshores, marshes, wet meadows; common. (*1274*, *1342*, *1382*, *1559*, *2786*, *2824*, *2825*, *3392*)

Carex crawfordii Fern. Gravel pits, gravelly roadsides, lake and pond shores; fairly common. (*235*, *275*, *281*, *2447*, *2484*, *2510*, *2528*, *2551*, *2567*)

Carex crinita Lam. Swampy woods, wet swales in riverbottom forests; frequent. (*1356*, *1473*, *2381*, *2451*)

Carex debilis Michaux. WHITE-EDGE SEDGE. Our only known location is a lightly wooded riverbank along the Black River, south. (*1778*)

Carex deweyana Schwein. DEWEY'S SEDGE. In a variety of moist to dryish woods; fairly common. (*145*, *1101*, *1390*, *1399*, *1519*, *1542*, *2293*, *2667*, *3286*, *3304*, *3307*)

Carex diandra Schrank. Shores, wet meadows and thickets; occasional. (*2192*, *3346*)

Carex disperma Dewey. Cedar swamps, hemlock-hardwood forests; fairly common. (*211*, *628*, *767*, *1073*)

Carex echinata Murray (Including *C. cephalantha* (L. Bailey) Bickn. and *C. angustior* Mackenzie) STAR SEDGE. Boggy and marshy lakeshores; alder thickets. (*2193*, *2413*, *3306*)

Carex foenea Willd. (*C. aenea* Fern.). One record: open sandy ground under a powerline. (*2040*)

Carex gracillima Schwein. GRACEFUL SEDGE. In a variety of moist to wet woods; fairly common. (*133*, *196*, *493*, *1230*, *1308*, *1357*)

Carex grayi Carey. Locally frequent along drainage channels in a very rich hardwood forest on an ice-walled-lake plain in the CNF. (*3390*)

Carex grisea Wahlenb. (*C. amphibola* Steudel var. *turgida* Fern.). Known only from a very rich hardwood forest on an ice-walled-lake plain in the CNF. (*3382*)

Carex gynandra Schwein. (*C. crinita* var. *gynandra* (Schwein.) Torrey & Schwein.). Moist to wet mixed woods, clearings, conifer swamps; common. (*198*, *739*, *1139*, *2474*, *3287*)

Carex gynocrates Wormsk. (*C. dioica* L. var. *gynocrates* (Wormsk.) Ostenf.) NORTHERN BOG SEDGE. Known from a wet, semi-open tamarack bog near Jerry Lake, in the CNF. A state special concern species. (*2421*)

Carex hirtifolia Mackenzie. Our only known location is a deciduous forest on the slope of an ice-walled-lake plain, in the CNF. (*3411*)

Carex houghtoniana Torrey. One record: a gravel pit in the CNF. (*233*)

Carex hystericina Muhl. Swamps, shores, and other wet places; somewhat local. (*2435*, *2539*, *3345*)

Carex interior L. Bailey. Cedar-black ash swamps, wet open places. (*1474*, *2189*)

Carex intumescens Rudge. Moist to wet woods and semi-open places; common. (*148*, *177*, *294*, *560*, *1359*, *2543*, *2799*, *3297*))

Carex lacustris Willd. Lake, pond, and stream margins, marshes, swamps, wet meadows, ditches; common. (*141*, *213*, *1194*, *1271*, *1381*, *2336*, *2355*, *3315*)

Carex pellita Willd. (*C. lanuginosa* Michaux) WOOLLY SEDGE. Locally in open grassy places along roads and railroads and in the moist open sandy floodplain of the Jump River. (*1096*, *1100*, *1507*, *3327*)

Carex lasiocarpa Ehrh. WIREGRASS. Bogs, tamarack swamps, sandy lakeshores; common. (*1140*, *1195*, *1373*, *1488*, *1526*, *2534*)

Carex leptalea Wahlenb. Cedar swamps; fairly common. (*1258*, *1402*, *1659*, *3310*, *3311*, *3312*)

Carex leptonervia (Fern.) Fern. Rich upland deciduous forests, riverbottom forests; fairly common. (*144*, *1178*, *2262*, *2541*, *3284*, *3293*)

Carex limosa L. MUD SEDGE. Sphagnum bogs, often in very wet places, as at the edges of bog pools; frequent. (*681*, *1141*, *1370*, *2801*)

Carex lupulina Muhl. HOP SEDGE. Wet swales in floodplain forests and thickets; damp places in rich deciduous woods; locally common. (*2166*, *2378*, *3380*, *3426*, *3429*, *3443*)

Carex magellanica Lam. subsp. irrigua (Wahlenb.) Hiitonen (*C. paupercula* Michaux) BOREAL BOG SEDGE. Sphagnum bogs; common. Occasional in cedar swamps. (*247*, *1316*, *1475*, *2493*, *2500*)

Carex normalis Mackenzie. Shaded river banks, moist woods; frequent. (*1238*, *1782*, *2352*, *2480*)

Carex oligosperma Michaux. Sphagnum bogs; common. (*249*, *251*, *679*, *1137*, *1351*, *1367*, *2020*, *2106*, *2360*)

Carex ormostachya Wieg. (sometimes included in *C. laxiflora* Lam. or *C. gracilescens* Steudel) Our only record is from a dry southeast-facing slope under red pine in the CNF. Associated species at this site included *Clematis occidentalis*. (*2281*)

Carex pallescens L. PALE SEDGE. One record: a grassy open roadside along a forest road in the Mondeaux area of the CNF. A Wisconsin special concern species (*C. pallescens* var. *neogaea* Fern.) . (*326*, *3366*)

Carex pauciflora Lightf. Wet open areas of bogs and tamarack swamps; local. (*1196*, *1371*)

Carex peckii Howe. Locally common on mossy logs in a cedar swamp draining to Sailor Creek, in the CNF. (*1072*)

Carex pedunculata Muhl. LONG-STALKED SEDGE. Rich upland woods, cedar swamps; fairly common. One of our earliest fruiting sedges. (*2218*, *2231*, *2291*, *3285*)

Carex pensylvanica Lam. PENNSYLVANIA SEDGE. Moist to dry woods and roadsides; common. (*137*, *139*, *406*, *1095*, *1322*, *2347*)

Carex plantaginea Lam. PLANTAIN-LEAVED SEDGE. Locally in rich upland woods. (*41*, *3292*)

Carex projecta Mackenzie. Wet meadows, moist to wet woods, shores, stream margins, gravel pits; common. (*246*, *1323*, *1358*, *1406*, *1428*, *1561*, *1590*, *1673*, *2412*, *2444*, *2554*, *2856*, *3325*, *3349*)

Carex pseudocyperus L. Lakeshores, especially where boggy; frequent. (*837*, *1343*, *2813*)

Carex radiata (Wahlenb.) Small (*C. rosea* Willd., sens. auct.). Shaded banks of major streams; frequent. One of our collections grew in association with *C. assiniboinensis*. (*1060*, *1229*, *1777*)

Carex retrorsa Schwein. Stream margins, ditches, shores, wet meadows; frequent. (*445*, *798*, *1291*, *1440*)

Carex rosea Schkuhr (*C. convoluta* Mackenzie). Deciduous woods and borders; frequent. (*1266*, *2640*, *3294*)

Carex scoparia Schkuhr. Fairly common in a variety of more or less open, wet to dry, habitats. (*237*, *298*, *1560*, *2190*)

Carex siccata Dewey (*C. foenea* Willd.). Locally common in a dry railroad "prairie," south. (*1090*, *1094*)

Carex sparganioides Muhl. Roadside bordering a mixed hardwood forest. (*1265*)

Carex sprengelii Dewey. Moist woods, riverbottom forests; local. (*209*, *1054*)

Carex sterilis Willd. One record: seasonally inundated shore of the Mondeaux Flowage. (*167*)

Carex stipata Muhl. Swamps, shores, wet meadows, marshes; common. (*203*, *1118*, *2301*, *3296*, *3305*)

Carex stricta Lam. TUSSOCK SEDGE. A hummock-forming sedge of wet meadows and bog edges. (*1138*, *1477*)

Carex tenera Dewey. Roadsides, railroads, gravel pits; frequent. (*195*, *280*, *1506*)

Carex tribuloides Wahlenb. Known from a moist open area along the Black River, south. (*2448*)

Carex trichocarpa Muhl. HAIRY-FRUITED SEDGE. Locally common in a sandy swale along the Jump River. (*1156*)

Carex trisperma Dewey THREE-SEEDED SEDGE. Wooded bogs and swamps, under tamarack, black spruce, cedar, hemlock, or black ash; common. (*248*, *373*, *1315*, *1372*, *1391*, *1469*, *1476*, *2161*, *2857*, *3375*)

Carex tuckermanii Dewey. Moist woods and riverbottom forests, especially at the edges of ephemeral woodland ponds; local. (*42*, *1254*, *2379*, *3379*)

Carex utriculata F. Boott. Along lakeshores and in the wettest parts of bogs, often at the edges of floating bog mats; apparently rather local. (*845*, *1366*, *1465*, *1489*, *1653*)

Carex vesicaria L. Along a quiet backwater of the Black River. (*2450*)

Carex vulpinoidea Michaux FOX SEDGE. Damp or wet roadsides, clearings, logging roads, gravel pits, stream margins; frequent. (*1512*, *1606*, *2400*, *2509*, *3363*)

Carex woodii Dewey. Rich mesic woods (Acer-Hydrophyllum habitat type); local. An early fruiting species. (*988*, *2230*, *2234*)

Cyperus bipartitus Torrey (*C. rivularis* Kunth). SHINING FLATSEDGE. Shores, gravel pits, roadsides; locally abundant. Tends to be weedy in moist open sandy or gravelly places. (*2090*, *2618*, *2637*, *2797*)

Cyperus diandrus Torrey UMBRELLA FLAT SEDGE. Our only known location is a grassy shore of Diamond Lake, in an area that is periodically mowed. (*1919*)

Cyperus esculentus L. YELLOW NUT-GRASS. A frequent agricultural weed. Also occasional in wet sand or gravel along streams. (*604*, *1664*, *1763*, *1987*, *2133*)

Cyperus schweinitzii Torrey. SCHWEINITZ'S FLATSEDGE. Locally common in dry sandy ground along the Pine Line recreational trail, an old railroad bed. (*1876*)

Cyperus squarrosus L. (*C. aristatus* Rottb.; *C. inflexus* (Muhl.) Palla). Locally frequent in moist sand along the Jump River. (*1989*)

Cyperus strigosus L. FALSE NUTSEDGE. Lakeshores, stream margins, ditches; frequent. (*1918*, *1988*, *2859*)

Dulichium arundinaceum (L.) Britton THREE-WAY SEDGE. Margins and shallow water of lakes and streams, wet parts of bogs, openings in tamarack swamps; fairly common. (*688*, *774*, *2487*, *2720*)

Eleocharis acicularis (L.) Roemer & Schultes NEEDLE SPIKE-RUSH. Wet sandy shores, mud flats, exposed peaty deposits in marshes; frequent. Often forming dense mats. (*2440*, *2506*, *2507*, *2583*, *2782*)

Eleocharis erythropoda Steudel (*E. calva* Torrey). Shores of lakes and ponds. The taxonomic problems involving *E. erythropoda*, *E. palustris*, *E. smallii* and several other taxa are considerable and still unresolved. Some recent authors have included some or all in one polymorphic complex. For discussions, see Swink & Wilhelm (1994) and Smith et al. (2002). (*510*, *843*)

Eleocharis intermedia (Muhl.) Schultes. "Colonies on floating bog in Rib Lake." (*Goessl 3043 MIL*, 1915.)

Eleocharis obtusa (Willd.) Schultes BLUNT SPIKE-RUSH. Two of our specimens are tentatively referred to this species which is very similar to *E. ovata* and sometimes treated as conspecific. Shores, ditches, and other wet places. (*566*, *663*)

Eleocharis ovata (Roth) Roemer & Schultes OVATE SPIKE-RUSH. Meadows, shores, streams, bog mats, mud flats, wet roadsides; common. (*1667*, *1858*, *1930*, *2091*, *2140*, *2589*, *2787*, *2815*)

Eleocharis palustris (L.) Roem. & Schult. (*E. smallii* Britton, in part) COMMON SPIKE-RUSH. Shores, wet bog mats; common. (*335*, *336*, *777*, *1936*, *2499*, *2572*)

Eriophorum angustifolium Honck. (*E. polystachion* L. in Gleason & Cronquist 1991.) "Rib Lake. Wet, in colonies." (*Goessl 140 MIL*, 1915.)

Eriophorum gracile Koch SLENDER COTTON-GRASS. "Spruce-tamarack- blueberry bog." (*Beals s.n. WIS*, 1959.)

Eriophorum tenellum Nutt. In the wetter parts of bogs; frequent. (*1375*, *1873*, *2404*, *2504*, *2515*, *2858*)

Eriophorum vaginatum L. (*E. spissum* Fern.). Common in spruce-tamarack bogs. (*250*, *1019*, *1136*, *2357*)

Eriophorum virginicum L. TAWNY COTTON-GRASS. Bogs; our commonest *Eriophorum*. (*682*, *822*, *1515*, *2015*, *2103*, *2109*, *2494*)

Rhynchospora alba (L.) Vahl WHITE BEAK-RUSH. Fairly common in bogs, especially in wetter areas bordering open water. (*685*, *1368*, *2088*, *2113*, *2757*, *2791*)

Schoenoplectus acutus (Muhl.) Löve & Löve (*Scirpus acutus* Muhl.) HARDSTEM BULRUSH. Known only from North Spirit Lake: shallow water, in hard gravelly substrate. (*2808*)

Schoenoplectus subterminalis (Torrey) Sojak (*Scirpus subterminalis* Torrey). This easily overlooked species appears to be abundant in a number of our lakes and ponds. Forms dense submersed beds on muck, peat, sand, or gravel, usually in fairly shallow water. Our specimens are all of sterile material. Once thought to be rare in the state because collections were few (Tans & Read 1975). (*1494*, *2066*, *2591*, *2712*, *2736*, *2740*, *2743*, *2818*, *2838*)

Schoenoplectus tabernaemontani (Gmelin) Palla (*Scirpus validus* Vahl) SOFTSTEM BULRUSH. Shallow water of lakes, ponds, and streams; fairly common. (*624*, *1688*, *2156*, *2441*, *2784*)

Schoenoplectus torreyi (Olney) Palla (*Scirpus torreyi* Olney) TORREY'S BULRUSH. Known only from Hulls Lake, in shallow water and gravelly substrate. A state special concern species. (*2780*)

Scirpus atrocinctus Fern. (*S. cyperinus* var. *brachypodus* (Fern.) Gilly). Wet open places; not common. Perhaps better considered a variety of *S. cyperinus*, but many authors retain it as a separate species. Our one collection, with its pedicellate spikelets, certainly seems distinct. (*221*)

Scirpus atrovirens Willd. Damp roadsides, meadows, and woodland clearings; ditches; shores; common. (*319*, *405*, *1273*, *1717*, *1755*, *1943*, *2018*, *2168*)

Scirpus cyperinus (L.) Kunth WOOL-GRASS. Wet roadsides and meadows, ditches, shores, stream margins, semi-open swamps, marshes, bog edges; often abundant. (*551*, *1928*, *2054*, *3428*)

Scirpus microcarpus C. Presl (*S. rubrotinctus* Fern.). Occasional in wet open gravelly areas. (*201*, *202*)

Additional records from adjacent counties:

Bolboschoenus fluviatilis (Torrey) Sojak (*Scirpus fluviatilis* (Torrey) A. Gray). Price: "Chain Lake."

Carex adusta F. Boott. Clark: open boggy woods.

Carex arcta F. Boott. Lincoln, Price: shores, ponds.

Carex blanda Dewey. Lincoln: deciduous woods.

Carex brevior (Dewey) Mackenzie. Clark, Lincoln: bluffs, roadsides.

Carex deflexa Hornem. Lincoln: woods, open gravel, pond borders.

Carex emoryi Dewey. Chippewa, Lincoln, Marathon: river banks, wet meadows.

Carex flava L. Lincoln: pond border.
Carex folliculata L. Clark: Mentor Marsh.
Carex gravida L. Bailey. Chippewa: gravel pit.
Carex haydenii Dewey. Lincoln: alder swamp, pond edge.
Carex lurida Wahlenb. Clark, Lincoln: in mud along stream, ditches.
Carex novae-angliae Schwein. Price: an old record; moist shaded ground.
Carex praegracilis W. Boott. Lincoln: roadside.
Carex sartwellii Dewey. Chippewa: wet meadow.
Carex scabrata Schwein. Lincoln: damp woods.
Carex umbellata Schkuhr. Lincoln: sandy or gravelly soil.
Cyperus engelmannii Steudel (*C. odoratus* L.). Chippewa: lakeshore.
Cyperus erythrorhizos Muhl. Chippewa: marshy shoreline.
Cyperus filiculmis Vahl (*C. lupulinus* (Sprengel) Marcks). Chippewa: sandy open field.
Eleocharis robbinsii Oakes. Chippewa: boggy lake.
Fimbristylis autumnalis (L.) Roemer & Schultes. Chippewa, Lincoln: sandy lakeshores.
Schoenoplectus heterochaetus (Chase) Sojak (*Scirpus heterochaetus* Chase). Rusk: "Shamrock Lake."
Schoenoplectus pungens (Vahl) Palla (*Scirpus americanus* Pers.). Chippewa, Rusk: lakeshores.
Schoenoplectus smithii (A. Gray) Sojak (*Scirpus smithii* A. Gray). Lincoln: sandy lakeshore.
Scirpus georgianus Harper (*S. atrovirens* var. *georgianus* (Harper) Fern.). Lincoln: low spot.
Scirpus hattorianus Makino (included by Gleason & Cronquist (1991) in *S. atrovirens*). Chippewa, Lincoln, Marathon: roadsides, meadows, bogs.
Scirpus pallidus (Britton) Fern. (*S. atrovirens* var. *pallidus* Britton). Lincoln: muddy riverbank.
Scirpus pedicellatus Fern. (*S. cyperinus* var. *pedicellatus* (Fern.) Schuyler. Chippewa, Lincoln: river banks, shores.

DIOSCOREACEAE Yam Family

Dioscorea villosa L. WILD YAM. Locally frequent in moist woods and thickets along the Yellow and Black Rivers. (*1226*, *1785*)

ERIOCAULACEAE Pipewort Family

Eriocaulon aquaticum (Hill) Druce (*E. septangulare* With.) PIPEWORT. Shallow water and shores of lakes, especially those with clear water and sand bottoms; fairly common in some lakes. (*330*, *1481*)

HYDROCHARITACEAE Frog's-bit Family

Elodea canadensis Michaux WATERWEED. Lakes, ponds and streams; abundant. (*1429*, *1585*, *2585*, *2609*, *2707*, *2711*)
Elodea nuttallii (Planchon) St. John WATERWEED. Common in a number of our lakes and ponds. Collected from both hard and soft water lakes. (*1409*, *1555*, *2626*, *2737*, *2745*)
Vallisneria americana Michaux WILD-CELERY or TAPE-GRASS. Lakes and streams; fairly common. (*1186*, *1498*, *1685*, *2777*)

IRIDACEAE Iris Family

Iris germanica L. GERMAN IRIS. This is the common garden iris. Untended plantings can persist for years. Occasionally found along roadsides where, presumably, it had been planted or dumped. Europe. (*2391*)
Another *Iris* sp. occasionally noted as an escape along Taylor County roadsides has dark violet flowers and is smaller than *I. germanica* in all respects. It has defied identification and may be a hybrid cultivar. (*1280*)
Iris pseudacorus L. YELLOW FLAG. Another Old World iris locally established in wet roadsides and along the edges of ponds and streams. (*1298*)
Iris versicolor L. BLUE FLAG. Wet bogs and meadows, marshes, shores, stream margins; fairly common. (*217*, *1277*, *1278*)
Iris virginica L. var. shrevei (Small) E. Anderson BLUE FLAG. One record: "Roadside, _ mile west of Rib Lake." (*Anderson 380 WIS*, 1947.)

Sisyrinchium campestre Bickn. PRAIRIE BLUE-EYED-GRASS. Rare; known only from one dry railroad "prairie." (*1085*, *2345*)

Sisyrinchium montanum Greene BLUE-EYED-GRASS. Grassy roadsides; local. (*1145*, *2344*)

JUNCACEAE Rush Family

Juncus brevicaudatus (Engelm.) Fern. Sandy shores and other wet open sandy or gravelly places; fairly common. Occasional in bogs. (*665*, *1649*, *1938*, *2057*, *2089*, *2092*, *2112*, *2616*, *2732*)

Juncus bufonius L. TOAD RUSH. Moist open sand or gravel, in places such as seldom-used roads and old gravel pits; locally common. (*207*, *2428*, *2505*)

Juncus canadensis J. Gay. Wet places in bogs, lakeshores; frequent. (*1369*, *2101*, *2115*, *2586*, *2739*, *2792*)

Juncus dudleyi Wieg. (*J. tenuis* var. *dudleyi* (Wieg.) F. J. Herm.). Collected only from a moist sandy open floodplain of the Jump River, but to be expected elsewhere in moist habitats. (*3368*)

Juncus effusus L. COMMON RUSH. Marshy shores, damp roadsides, old logging roads through moist or wet woods, open parts of swamps; common. (*222*, *407*, *733*, *1167*, *1272*, *1583*, *1939*, *2167*, *2437*, *2802*)

Juncus filiformis L. Locally in a moist sandy open floodplain of the Jump River where it is part of a rich local flora that includes many species unknown or uncommon elsewhere in the county. (*3330*, *3331*)

Juncus interior Wieg. Our one record is from an old logging road through a moist deciduous forest. (*2919*)

Juncus nodosus L. Another species known only from the sandy open floodplain of the Jump River. (*3367*)

Juncus tenuis Willd. PATH RUSH. Very common in a variety of moist, often disturbed, places. (*171*, *172*, *206*, *223*, *236*, *274*, *283*, *284*, *292*, *305*, *660*, *1704*, *1781*, *1787*, *1890*, *2508*, *2918*, *3406*)

Juncus torreyi Cov. In cinders along an abandoned railroad siding in Lublin. (*706*)

Luzula accuminata Raf. WOOD RUSH. Woods and roadsides; common. (*134*, *851*)

Luzula multiflora (Retz.) Lejeune WOOD RUSH. Dry woods and openings; occasional. (*926*, *1110*, *2318*, *2346*)

Additional records from adjacent counties:

Juncus articulatus L. Price: sandy lakeshore.

Juncus marginatus Rostk. Lincoln: damp grassy spot.

Juncus pelocarpus E. Meyer. Chippewa, Lincoln, Price, Rusk: lakeshores.

LEMNACEAE Duckweed Family

Lemna minor L. DUCKWEED. Often very abundant in quiet water of lakes, ponds, and streams. (*1241*, *1289*)

Lemna trisulca L. STAR DUCKWEED. Known from Anderson Lake and the Chequamegon Waters Flowage, in the CNF. Unlike other duckweeds, occurs in masses just beneath the water surface. (*1686*)

Lemna turionifera Landolt (included in *L. minor* by Gleason & Cronquist (1991)). "Deepwater marsh, Mondeaux Flowage." (*Hansen 60 WIS*, 1971.)

Spirodela polyrhiza (L.) Schleiden GREATER DUCKWEED. Quiet water of lakes, ponds, and streams; abundant. (*1288*)

Wolffia borealis (Engelm.) Landolt (*W. punctata* auct. non Griseb.) WATER-MEAL. Known from Spirit Lake, associated with *Lemna minor*, *Spirodela polyrhiza*, and *W. columbiana*. Wolffias are the smallest known flowering plants. (*2809*)

Wolffia columbiana Karst. WATER-MEAL. Locally abundant in quiet water of ponds and lakes, floating at or near the surface, usually with *Lemna minor* and *Spirodela polyrhiza*. (*1290*, *1904*, *2708*)

LILIACEAE Lily Family

Allium schoenoprasum L. CHIVES. Escaped to a neglected grassy area and adjacent gravel driveway in Donald. This is apparently the North American var. *sibiricum* (L.) Hartman, but not native in our area. (*3477*)

Allium tricoccum Aiton WILD LEEK. Rich mesic hardwood forests, wooded bottomlands; common. (*380*, *888*, *2224*)

Asparagus officinalis L. ASPARAGUS. The common garden plant; frequently escaping to roadsides. Europe. (*426*)

Clintonia borealis (Aiton) Raf. BLUEBEAD-LILY. Moist to rather wet woods; common. (*188*, *3031*)

Convallaria majalis L. LILY-OF-THE-VALLEY. An old-fashioned garden flower occasionally found persisting and spreading around old cellar holes and cemeteries. Europe. (*1024*)

Erythronium albidum Nutt. WHITE TROUT-LILY. Locally in woods and thickets near the Black River, southwards. Also known from a rich hardwood forest on an ice-walled-lake plain in the CNF. (*903*, *911*)

Erythronium americanum Ker Gawler YELLOW TROUT-LILY. Rich moist woods. Especially abundant in riverbottom forests. (*900*, *2236*)

Hemerocallis fulva (L.) L. ORANGE DAY-LILY. Widely cultivated and frequently escaping to roadsides. Asia. (*436*)

Lilium lancifolium Thunb. TIGER LILY. A weedy roadside in Perkinstown supports a thriving colony, most likely a relict of cultivation. Asia. (*3439*)

Lilium michiganense Farw. MICHIGAN LILY. Black ash swamps, bottomland forests, moist roadsides and thickets; frequent. (*442*, *1053*)

Maianthemum canadense Desf. CANADA MAYFLOWER or WILD LILY-OF- THE-VALLEY. Common to abundant in a variety of woodlands. (*131*, *3033*, *3251*)

Maianthemum racemosum (L.) Link (*Smilacina racemosa* (L.) Desf.) FALSE SOLOMON'S SEAL. Woods, especially on slopes; frequent. (*1078*)

Maianthemum stellatum (L.) Link (*Smilacina stellata* (L.) Desf.) STARRY FALSE SOLOMON'S SEAL. Sandy woods and open places along the Black and Jump Rivers; not common. (*1035*, *3369*)

Maianthemum trifolium (L.) Sloboda (*Smilacina trifolia* (L.) Desf.) THREE-LEAVED FALSE SOLOMON'S SEAL. Boggy coniferous and mixed swamps; fairly common. (*161*, *636*, *3259*)

Narcissus poeticus L. POET'S NARCISSUS. Growing and apparently spreading in a grassy roadside along Highway 64, far from any dwelling. Europe. (*2339*)

Polygonatum biflorum (Walter) Elliott SOLOMON'S SEAL. A few colonies occur along railroad tracks in the western part of the county. Our plants are very large and may be tetraploids, sometimes segregated as var. *commutatum* (Schultes f.) Morong. (*647*)

Polygonatum pubescens (Willd.) Pursh. SOLOMON'S SEAL. Fairly common in rich moist forests. (*155*, *1061*, *3275*)

Streptopus lanceolatus (Aiton) Reveal (*S. roseus* Michaux) TWISTED STALK. Woods; common in places. (*1040*, *2285*, *3257*)

Trillium cernuum L. NODDING TRILLIUM. Moist to wet woods; frequent. (*146*, *3007*)

Trillium grandiflorum (Michaux) Salisb. LARGE-FLOWERED or COMMON TRILLIUM. Moist, usually rich, deciduous woods; abundant in places. (*129*, *993*, *2222*)

Uvularia grandiflora Sm. BELLWORT. Rich deciduous or hemlock-hardwood forests and borders; frequent to fairly common. (*887*, *2225*)

Uvularia sessilifolia L. WILD-OATS or MERRYBELLS. Rich woods and borders; frequent. (*885*, *992*, *1627*)

Additional records from adjacent counties:

Lilium philadelphicum L. WOOD LILY. Rusk: sandy jack pine woods.

NAJADACEAE Naiad or Water-nymph Family

Najas flexilis (Willd.) Rostkov & Schmidt. Lakes, ponds, and streams; abundant. (*1437*, *1557*, *1569*, *2584*, *2620*)

Najas gracillima (A. Braun) Magnus. Locally in soft water lakes; collected from St. Clair and South Harper Lakes. (*1937*, *2619*, *2748*)

ORCHIDACEAE Orchid Family

Calopogon tuberosus (L.) BSP. GRASS PINK. Wet sphagnum bogs, especially boggy lakeshores and near the edges of bog pools; frequent. (*1378*, *1516*, *2789*)

Coeloglossum viride (L.) Hartman (*Habenaria viridis* (L.) R. Br.) LONG- BRACTED GREEN ORCHID. One record: several plants growing alongside a hiking trail through a rich upland hardwood forest in the CNF. (*2284*)

Corallorhiza maculata (Raf.) Raf. SPOTTED CORAL-ROOT. Frequent in mixed upland woods. (*457*, *2425*)

Corallorhiza odontorhiza (Willd.) Nutt. AUTUMN or FALL CORAL-ROOT. Rich moist forests. Fairly numerous in one of our two known locations. Taylor County is apparently at the northern edge of its range in Wisconsin. A state special concern species. (*2086*, *2723*)

Corallorhiza trifida Châtel. EARLY CORAL-ROOT. Woods; usually near the edges of, and sometimes in, cedar, black ash, or mixed swamps; occasional to frequent. (*1041*, *1180*, *2278*)

Cypripedium acaule Aiton PINK LADY-SLIPPER. Frequent in sphagnum bogs and tamarack-black spruce swamps; occasional in upland mixed woods. (*160*, *2319*, *3264*)

Cypripedium parviflorum Salisb. An extremely variable species. Two varieties in our area:

var. makasin (Farw.) Sheviak (*C. calceolus* var. *parviflorum* (Salisb.) Fern.) SMALL YELLOW LADY'S-SLIPPER. A specimen at MIL is apparently this variety; the label reads: "Rib Lake. Bog on Cty M." (*Powers & Kolodzyk 1342-76 MIL*, 1976.). A more recent collection from a black ash-cedar swamp along the upper reaches of Bear Creek in the CNF is tentatively identified as this. (*Fields & Parker 1177 WIS*). Wisconsin special concern at the species level (*C. parviflorum*).

var. pubescens (Willd.) O.W. Knight (*C. calceolus* L. var. *pubescens* (Willd.) Correll) LARGE YELLOW LADY'S-SLIPPER. Rich cedar and mixed black ash-cedar swamps; frequent, but mainly in the CNF. (*1126*, *1176*)

Cypripedium reginae Walter SHOWY LADY-SLIPPER. Frequent in a rich semi-open tamarack-cedar swamp in the CNF, in an area of glacial outwash. This, our largest orchid, is quite striking when in flower. Unfortunately, excessive collecting, habitat loss, and possibly deer browsing, have put this species at risk in parts of its range. A Wisconsin special concern species. (*1260*)

Galearis spectabilis (L.) Raf. SHOWY ORCHIS (*Orchis spectabilis* L.). Sight record by author from a rich mesic hardwood forest on an ice-walled-lake plain northwest of Perkinstown, CNF, 14 May 2000. One individual in full flower; no voucher specimen taken.

Goodyera pubescens (Willd.) R. Br. DOWNY RATTLESNAKE-PLANTAIN. Rare; known only from a dryish red oak-dominated hardwood forest in the southwestern corner of the county. (*2651*)

Goodyera repens (L.) R. Br. LESSER RATTLESNAKE-PLANTAIN. Our one record is without habitat data, but the species generally prefers conifer forests. (*Davis s.n. WIS*, 1920.)

Goodyera tesselata Lodd. CHECKERED or TESSELATED RATTLESNAKE- PLANTAIN. As with the previous species, no habitat data accompanies our one known specimen. Moist coniferous woods are the usual habitat. (*Davis s.n. WIS*, 1920.)

Malaxis monophyllos (L.) Sw. var. brachypoda (A. Gray) F. Morris & E.A. Eames (*M. brachypoda* A. Gray) WHITE ADDER'S-MOUTH. Black ash-cedar swamps; rare. Known from several swamps in the CNF, but never numerous. Small and easily missed. A state special concern species. (*629*, *1660*, *2426*)

Malaxis unifolia Michaux GREEN ADDER'S-MOUTH. One documented record: "Chequamegon National Forest near Perkinstown." (*Curtis s.n. WIS*, 1941.). A reliable 1997 sight record has it from a sugar maple-basswood forest, also in the CNF.

Platanthera clavellata (Michaux) Luer (*Habenaria clavellata* (Michaux) Sprengel) CLUB-SPUR ORCHID. Tamarack-black spruce bogs, in sphagnum; rare or overlooked. (*2492*)

Platanthera flava (L.) Lindley var. herbiola (R. Br.) Luer (*Habenaria flava* (L.) R. Br.) TUBERCLED ORCHID. Locally in open sandy floodplain "prairies" along the Jump River; forming a large colony in one location, though it seems to be much more numerous in some years than others. Listed as threatened in Wisconsin. (*3324*, *3360*)

Platanthera hookeri (Torrey) Lindley (*Habenaria hookeri* Torrey) HOOKER'S ORCHID. Dry mixed woods on gravelly end moraine topography; rare. A state special concern species. (*2371*)

Platanthera huronensis (Nuttall) Lindley (*P. hyperborea* (L.) Lindley var. *huronensis* (Nuttall) Luer; *Habenaria hyperborea* (L.) R. Br.) TALL NORTHERN BOG ORCHID. Hardwood and mixed swamps, alder thickets; frequent and widespread. Recent work on the *Platanthera hyperborea* complex has resulted in some Wisconsin collections being referred to *P. huronensis* while others are likely *P. aquilonis* Sheviak, a newly recognized species. While both species probably occur in Taylor County, ours are here placed under *P. huronensis* pending more information. (*254*, *2698*, *3314*)

Platanthera lacera (Michaux) G. Don (*Habenaria lacera* (Michaux) Lodd.) GREEN FRINGED or RAGGED FRINGED ORCHID. Dry to moist grassy meadows and roadsides; occasional. (*356*, *1509*, *2537*)

Platanthera obtusata (Banks) Lindley (*Habenaria obtusata* (Banks) Richardson) BLUNT-LEAF ORCHID. A single old record: "Rib Lake. One plant in deep moss." (*Goessl 153 MIL*, 1915.)

Platanthera orbiculata (Pursh) Lindley (*Habenaria orbiculata* (Pursh) Torrey). ROUND-LEAVED ORCHID. Our one record, from "Hannibal, Wis.," lacks habitat data. A state special concern species. (*Davis s.n. WIS*, 1920.)

Platanthera psychodes (L.) Lindley (*Habenaria psychodes* (L.) Sprengel) PURPLE FRINGED ORCHID. Rather frequent in damp roadsides and grassy open black ash swamps. A handsome and conspicuous orchid. (*515*, *531*)

Pogonia ophioglossoides (L.) Ker Gawler ROSE POGONIA. Wet sphagnum bogs near the edges of bog pools; boggy lakeshores; often associated with *Calopogon tuberosus*; occasional. (*1377*, *1487*)

Spiranthes casei Catling & Cruise CASE'S LADIES'-TRESSES. Frequent in dry open sandy or gravelly soil. This and the following species favor disturbed sites. Named for Michigan botanist Frederick Case. (*602*, *607*, *1906*, *2062*, *2716*)

Spiranthes cernua (L.) Rich. NODDING LADIES'-TRESSES. Dry to moist open sandy places; occasional to frequent. (*666*, *2095*, *2151*, *2776*)

Spiranthes lacera (Raf.) Raf. SLENDER LADIES'-TRESSES. One record, without habitat data: "Little Rib Lake, 1 mile west of Rib Lake." Should be sought in dry sandy open or lightly wooded places. (*Anderson 415 & 416 WIS*, 1947.)

Additional records from adjacent counties:

Arethusa bulbosa L. Chippewa: boggy lakeshore. A state special concern species.

Calypso bulbosa (L.) Oakes. Price: "Rice Lake." Threatened in Wisconsin.

Liparis loeselii (L.) Rich. Lincoln, Marathon: bog, moist field.

Listera cordata (L.) R. Br. Price: bog.

Platanthera dilatata (Pursh) Lindley (*Habenaria dilatata* (Pursh.) Hook.). Lincoln: cold swamp. Of special concern in Wisconsin.

Spiranthes romanzoffiana Cham. Clark, Lincoln: riverbank, roadside, pasture.

POACEAE (GRAMINEAE) Grass Family

Agrostis gigantea Roth (*A. alba* auct. non L.) REDTOP. A forage grass now common in a variety of habitats, including fields, roadsides, railroads, and disturbed places. Europe. (*225*, *290*, *355*, *1529*, *1849*, *2822*)

Agrostis hyemalis (Walter) Britton, Sterns & Pogennb. TICKLEGRASS. Roadsides, shores, disturbed places; common. (*227*, *288*, *357*, *374*, *819*, *1480*, *2043*)

Agrostis perennans (Walter) Tuckerman AUTUMN or UPLAND BENTGRASS. Frequent in moist to wet woods. (*630*, *812*, *1922*)

Alopecurus aequalis Sobol. SHORT-AWN FOXTAIL. Damp, disturbed gravelly or sandy places; occasional. (*1188*)

Alopecurus pratensis L. MEADOW FOXTAIL. Locally abundant in low pastures, moist roadsides, and along railroads. Eurasia. (*484*, *1421*)

Andropogon gerardii Vitman BIG BLUESTEM. Abundant along railroad tracks, often spreading to adjacent roadsides. Also common in the narrow open floodplain of the Jump

River, probably one of our few original populations of this mesic prairie species. (*486*, *790*, *802*)

Anthoxanthum odoratum L. SWEET VERNAL GRASS. Mainly in the northeastern quarter of the county where it is frequent along roadsides and in other open grassy places. Europe. (*1036*, *1361*, *1582*, *1950*, *2310*)

Aristida basiramea Engelm. FORKTIP TRIPLE-AWN GRASS. Locally common in gravel road shoulders and dry roadside banks. (*715*, *2657*, *2774*)

Avena sativa L. OATS. Frequent along railroads and roadsides. From dropped grain and not persisting. Eurasia. (*707*)

Brachyelytrum erectum (Schreb.) P. Beauv. Fairly common in mesic woods. We have both the typical variety and var. septentrionale Babel, sometimes considered a separate species. (*391*, *404*)

Bromus ciliatus L. FRINGED BROME. Moist woods, shores, along railroads; common. (*559, 832, 1548, 1568, 3211*)

Bromus inermis Leyss. SMOOTH BROME. Fairly common along roadsides and railroads. Europe. (*783*)

Bromus kalmii A. Gray. Known from one railroad "prairie." (*1735*)

Bromus altissimus Pursh (*B. latiglumis* (Shear) A. Hitchc) Lightly shaded stream banks and bottomland forests; common. (*491,, 1681, 1821, 1973, 2131, 2461*)

Bromus pubescens Muhl. CANADA BROME. Moist to dry woods and borders; frequent. (*365*, *1268*, *1535*, *1908*, *2479*)

Calamagrostis canadensis (Michaux) P. Beauv. BLUEJOINT GRASS. Wet meadows and roadsides, marshes, bog edges, shores; abundant. (*347*, *348*, *686*, *1383*, *1392*, *1594*)

Cinna arundinacea L. COMMON WOODREED. Rich moist woods, bottomlands; frequent. (*563*, *676*, *1837*, *1913*, *2008*, *2177*)

Cinna latifolia (Trev.) Griseb. DROOPING WOODREED. Cedar swamps and other lowland woods, moist upland forests, along streams; fairly common. (*40*, *408*, *499*, *631*, *836*, *2185*)

Dactylis glomerata L. ORCHARD GRASS. Roadsides, old fields, meadows; frequent. Eurasia. (*181*, *415*, *2001*, *2694*)

Danthonia spicata (L.) F. Beauv. POVERTY GRASS. Frequent in dry places, both open and lightly wooded. (*226*, *492*, *839*, *1329*, *1497*, *1527*, *1706*)

Deschampsia cespitosa (L.) P. Beauv. TUFTED HAIRGRASS. Locally common in moist open sandy places along the Jump River. A Wisconsin special concern species. (*3328*, *3361*)

Digitaria ischaemum (Schreb.) Muhl. SMOOTH CRABGRASS. Roadsides and disturbed sites, weedy in lawns and gardens; common. Europe. (*658*, *2094*, *2773*)

Digitaria sanguinalis (L.) Scop. HAIRY CRABGRASS. An occasional weed of gardens and disturbed places. Europe. (*2562*, *2636*)

Echinochloa crusgalli (L.) P. Beauv. BARNYARD GRASS. Moist roadsides, low fields, pond edges, disturbed places; fairly common. Eurasia. (*550*, *609*, *1885*)

Echinochloa muricata (P. Beauv.) Fern. (*E. pungens* (Poiret) Rydb.) BARNYARD GRASS. In similar habitats as the above species; fairly common. (*435*, *577*, *2114*)

Elymus canadensis L. CANADA WILD-RYE. Along railroads, woods; frequent. (*43*, *1746*)

Elymus hystrix L. (*Hystrix patula* Moench) BOTTLEBRUSH GRASS. In rich woods and along streams; frequent to fairly common. (*358*, *1395*, *1447*)

Elymus riparius Wieg. STREAMBANK WILD-RYE. Bottomlands and banks of major streams; occasional. (*2178*)

Elymus trachycaulus (Link) Gould (*Agropyron trachycaulum* (Link) Malte) SLENDER WHEATGRASS. Along railroads and in forest openings; frequent. (*487*, *744*)

Elymus villosus Muhl. DOWNEY or HAIRY WILD-RYE. Bottomland forests; sometimes in open places; local. (*458*, *821*)

Elymus virginicus L. VIRGINIA WILD-RYE. Along streams and in moist woods; frequent. Occasional plants with very narrow glumes may represent hybrids with *E. hystrix*, according to *Elymus* authority J. Campbell, who checked my collections. (*95*, *500*, *803*, *838*, *1770*, *1822*, *1974*)

Elymus wiegandii Fern. Riverbottom forests; occasional. (*506*, *1975*)

Elytrigia repens (L.) Nevski (*Agropyron repens* (L.) Beauv.) QUACK GRASS. An abundant and aggressive weed of roadsides, gardens, fields, and other disturbed places. Eurasia. (*282*)

Eragrostis pectinacea (Michaux) Nees LOVEGRASS. Roadsides, railroads, disturbed places; frequent to fairly common. (*1739*, *2660*)

Eragrostis spectabilis (Pursh) Steudel PURPLE LOVEGRASS. Railroads, gravel pits; frequent. (*705*, *2687*, *2688*)

Festuca elatior L. (*F. arundinacea* Schreb.; *Lolium arundinaceum* (Schreb.) Darbeyshire) TALL FESCUE. Apparently found in some lawn seed mixtures, escaping to roadsides and other disturbed places; frequent. Eurasia. (*311*, *1187*, *1311*, *1532*, *2351*)

Festuca obtusa Biehler (*F. subverticillata* (Pers.) Alexeev) NODDING FESCUE. Rich upland deciduous forests, bottomland forests; frequent. (*368*, *1267*, *1398*, *1775*, *2374*)

Festuca pratensis Hudson (*F. elatior* L., misapplied) MEADOW FESCUE. A weed in damp ground at the low end of a corn field; probably more common than our single collection would suggest. Europe. (*3398*)

Festuca rubra L. RED FESCUE. Roadsides, gravel pits, semi-open woods; common. Though native to both North America and Europe, probably most, if not all, of our plants are European strains. (*184*, *186*, *423*, *424*, *1520*, *2350*, *2693*)

Festuca trachyphylla (Hackel) Krajina (*F. ovina* var. *duriuscula* (L.) Koch) HARD FESCUE. Roadsides, lawns. A weedy species, probably introduced via lawn seed mixtures. Eurasia. (*313*, *3405*)

Glyceria borealis (Nash) Batch. NORTHERN MANNA GRASS. Lakeshores, often emergent in shallow water. Known from Spirit and Birch Lakes. (*2552*, *2593*)

Glyceria canadensis (Michaux) Trin. RATTLESNAKE GRASS. Marshes, shores, stream margins, moist roadsides; fairly common. (*490*, *578*, *776*, *1393*, *1652*, *1948*, *2436*, *2488*)

Glyceria grandis S. Watson AMERICAN or REED MANNA GRASS. Wet meadows; locally abundant. (*1857*)

Glyceria striata (Lam.) A. Hitchc. FOWL MANNA GRASS. Wet places, generally; common. (*230*, *312*, *1401*, *1470*, *1658*, *1963*, *2454*, *3299*)

Hierochloë odorata (L.) P. Beauv. SWEET GRASS. Known from a moist grassy roadside near Lublin and an open moist sandy floodplain of the Jump River. Highly valued by American Indians for its fragrant foliage. (*1098*, *3326*)

Hordeum jubatum L. FOXTAIL-BARLEY, SQUIRREL-TAIL GRASS. Roadsides, railroads, waste places; fairly common. Introduced from the western U.S. (*354*)

Leersia oryzoides (L.) Swartz RICE CUT-GRASS. Shores, marshes, wet roadsides; locally abundant. (*567*, *2785*)

Leersia virginica Willd. WHITE GRASS. River banks, damp semi-open places in woods; frequent. (*612*, *1977*, *2725*)

Leptochloa fascicularis (Lam.) A. Gray (*Diplachne acuminata* Nash) SPRANGLETOP or SALT MEADOW GRASS. Growing with *Puccinellia distans* near the salt piles in the Taylor County Highway Department yards in Medford. Introduced from farther south and west, now spreading along salted highways in the Upper Midwest. (*2672*)

Leptoloma cognatum (Schultes) Chase FALL WITCH GRASS. In dry open ground along the railroad tracks in Medford. (*2674*)

Lolium perenne L. PERENNIAL RYE GRASS. Disturbed places; frequent. Two of our collections are from newly reconstructed roadsides where this fast-growing grass was probably seeded for erosion control. Europe. (*394*, *1161*, *1422*, *2000*)

Milium effusum L. WOOD-MILLET. Rich deciduous and hemlock-hardwood forests; frequent. (*1910*, *2337*)

Miscanthus sacchariflorus (Maxim.) Hackel AMUR SILVER-GRASS. An ornamental grass, occasionally spreading or escaping from cultivation. Asia. (*709*)

Muhlenbergia frondosa (Poiret) Fern. Occasional in wooded bottomlands along the Jump River. (*1976*)

Muhlenbergia glomerata (Willd.) Trin. MARSH WILD-TIMOTHY. Though usually reported from wetland habitats, our specimens are all from rather dry open places, mostly along the railroad tracks in the western part of the county. (*589*, *701*, *1833*, *1834*, *1902*, *2117*, *2718*)

Muhlenbergia mexicana (L.) Trin. Roadsides and railroads, damp woods, sandy river banks; fairly common. (*615*, *830*, *1734*, *2134*, *2648*, *2658*, *2692*, *2697*, *2700*, *2717*, *2821*)

Muhlenbergia racemosa (Michaux) BSP. Dry ground along the railroad tracks in Gilman. (*2682*)

Oryzopsis asperifolia Michaux ROUGH-LEAVED RICE-GRASS. Upland woods; frequent to fairly common. (*166*, *1103*, *2251*, *3237*)

Oryzopsis pungens (Torrey) A. Hitchc. Dry disturbed ground. (*232*)

Panicum acuminatum Sw. var. fasciculatum (Torrey) Lelong (*Dichanthelium acuminatum* var. *fasciculatum* (Torrey) Freckmann). Common in a variety of dry or moist, open or lightly shaded, places; usually in sandy soil. A rather variable species. Also included here are *P. lanuginosum* and *P. villosissimum*. (*273*, *399*, *725*, *751*, *1285*, *1310*, *1340*, *1500*, *1533*, *1549*, *1599*, *1705*, *1879*, *1923*, *1985*, *2041*, *2063*, *2096*, *2511*, *2696*, *2719*)

Panicum capillare L. WITCH GRASS. Along railroad tracks and roadsides, in dry or moist conditions; fairly common. (*571*, *711*, *2772*, *3436*)

Panicum columbianum Scribn. (*Dichanthelium sabulorum* (Lam.) Gould & Clark). Dry open ground in a gravel pit. (*228*)

Panicum dichotomiflorum Michaux. Railroads and roadsides; frequent. (*549*, *712*, *1806*, *2569*, *2679*)

Panicum leibergii (Vasey) Scribn. (*Dichanthelium leibergii* (Vasey) Freckmann). Grassy railroad embankment, with big bluestem. (*1747*)

Panicum linearifolium Scribn. (*Dichanthelium linearifolium* (Scribn.) Gould). Gravel pits and dry sandy roadsides; frequent. (*241*, *266*, *1528*)

Panicum miliaceum L. PROSO or BROOMCORN MILLET. An occasional weed in towns and along railroads. Probably from wild bird seed mixes and not long persisting. An Old World native. (*1697*, *1871*)

Panicum oligosanthes Schultes var. scribnerianum (Nash) Fern. (*Dichanthelium oligosanthes* var. *scribnerianum* (Nash) Gould). Dry grassy railroad right-of-way. (*1733*)

Panicum virgatum L. SWITCHGRASS. Fairly common in the narrow sandy floodplain of the Jump River, with numerous other prairie species. Rarely along railroads. (*1696*, *1914*)

Panicum xanthophysum A. Gray (*Dichanthelium xanthophysum* (A. Gray) Freckmann). Dry open woods; occasional. (*1503*, *2443*, *2664*)

Phalaris arundinacea L. REED CANARY GRASS. All too abundant in meadows, stream margins, shores, and damp roadsides, often crowding out other vegetation. While native to both North America and Europe, its aggressiveness in Taylor County suggests that most of our colonies are derived from strains introduced for forage or erosion control. (*190*, *1341*)

Phalaris canariensis L. CANARY GRASS. An occasional waif in railroad track ballast. Probably not long persisting. Europe. (*831*)

Phleum pratense L. TIMOTHY. Abundant in meadows, roadsides, and a wide variety of more or less open places. A common forage and hay crop. Europe. (*182*, *265*)

Phragmites australis (Cav.) Trin. (*P. communis* Trin.) COMMON REED. Forming small patches in ditches along roads and railroads; occasional to frequent. (*594*)

Poa alsodes A. Gray GROVE BLUEGRASS. Rich deciduous or hemlock-hardwood forests, riverbottom forests; frequent. (*152*, *996*, *1056*, *2240*, *2261*, *2294*)

Poa annua L. ANNUAL BLUEGRASS. Lawns and moist well-trodden places. Eurasia. (*2087*)

Poa compressa L. CANADA BLUEGRASS. Common in open, usually dry, disturbed places. Occasional in dryish woods. Eurasia. (*285*, *291*, *703*, *782*, *1199*, *1745*, *1845*, *2369*)

Poa paludigena Fern. & Wieg. BOG BLUEGRASS. Along a cold spring run in a hardwood forest and in an adjoining cedar-black ash swamp in the Mondeaux area of the CNF. Apparently locally common. Listed as threatened in Wisconsin. (*3348*, *3350*, *3355*, *3357*, *3359*)

Poa palustris L. FOWL MEADOW GRASS. Damp open places, stream margins. (*1986*, *2187*, *3329*)

Poa pratensis L. KENTUCKY BLUEGRASS. Abundant in a wide variety of dry to damp habitats, including roadsides, fields, lawns, meadows, woods, rock outcrops, and river banks. Apparently native in the northern U.S., though most of our strains are likely of European origin. (*142*, *165*, *176*, *185*, *205*, *216*, *234*, *501*, *1309*, *1313*, *1534*, *2295*, *2453*)

Poa saltuensis Fern. & Wieg. In moist shady woods, as well as dryer, more open, places; frequent. (*143*, *229*, *231*, *1123*, *3356*)

Poa trivialis L. ROUGH BLUEGRASS. Wet roadside along County Highway C. Europe. (*Beals s.n. WIS*, 1959.)

Puccinellia distans (Jacq.) Parl. ALKALI GRASS. Known from a weedy area in the Taylor County Highway Department yards in Medford where it grows with *Leptochloa fascicularis*. A salt-tolerant species characteristic of highway shoulders in southeastern Wisconsin, but apparently a relative newcomer to Taylor County. Europe. (*2671*)

Puccinellia pallida (Torrey) Clausen (*Torreyochloa pallida* (Torrey) Church; *Glyceria pallida* (Torrey) Trin.; including *P. fernaldii* (A. Hitchc.) Voss). Wet meadows, shores, stream margins; fairly common. (*1380*, *1668*, *1780*, *1932*, *2458*)

Schizachne purpurascens (Torrey) Swallen FALSE MELIC. Fairly common in a variety of moist to dryish forest types. (*138*, *174*)

Schizachyrium scoparium (Michaux) Nash (*Andropogon scoparius* Michaux) LITTLE BLUESTEM. Frequent in dry places along railroad tracks and highways. (*485*, *1878*, *2820*)

Secale cereale L. RYE. Formerly sown on dikes and along firelanes at the Pershing State Wildlife Area, and perhaps persisting there and elsewhere for a short time. Eurasia. (*Manville s.n. UWSP*, 1974.)

Setaria faberi Herrm. GIANT FOXTAIL. Mainly a weed of fields, roadsides, and waste places, though one of our collections is from a sandbar in the Black River. According to Voss (1972) and others, this is a recent Asian invader. Rapidly becoming common in Taylor County, as elsewhere. (*572*, *785*, *1811*, *1968*, *2139*, *2655*)

Setaria glauca (L.) P. Beauv. (*S. lutescens* (Wiegel) Hubb.) YELLOW FOXTAIL. Roadsides and fields; common. Europe. (*1536*, *1699*, *1764*)

Setaria viridis (L.) P. Beauv. GREEN FOXTAIL. Roadsides and waste places. Europe. (*1420*, *3437*)

Sorghastrum nutans (L.) Nash INDIAN GRASS. Along railroad tracks; rare. An attractive native prairie grass. (*488*, *788*)

Sorghum bicolor (L.) Moench SORGHUM, BROOMCORN. Agricultural crop rarely escaping or accidentally seeded; not persisting. Eurasia or Africa. (*2163*)

Spartina pectinata Link PRAIRIE CORDGRASS. Common in the narrow sandy floodplain of the Jump River, associated with big bluestem, switchgrass, and numerous other mesic prairie species. Also in scattered locations along the Yellow River below Gilman. A large patch occurs in dry ground along the railroad tracks on Medford's north side. (*801*, *1711*)

Sphenopholis intermedia Rydb. SLENDER WEDGEGRASS. Shores and stream margins; local. (*175*, *3362*)

Sporobolus cryptandrus (Torrey) A. Gray SAND DROPSEED. In dry ground along railroad tracks; frequent. (*268*, *1881*, *2568*)

Sporobolus vaginiflorus (Torrey) A. Wood POVERTY-GRASS. Dry roadsides and railroad right-of-ways; frequent. (*657*, *2099*, *2673*, *2775*, *2935*)

Triticum aestivum L. WHEAT. Frequent along railroad tracks. From spilled grain and not persisting. Eurasia. (*349*, *833*)

Zizania palustris L. WILD-RICE. Shallow water of flowages and streams; abundant in places. Often artificially seeded for wildlife. (*27*, *1563*, *2579*, *2666*, *2932*)

Additional records from adjacent counties:

Agrostis stolonifera L. Lincoln, Marathon, Price: lakeshores, woods, clearings, garden weed.

Avena fatua L. Marathon: railroads, roadsides, fields, weedy places.

Beckmannia syzigachne (Steudel) Fern. Lincoln, Price: damp roadsides.

Bouteloua hirsuta Lagasca. Chippewa: dry sandy open area.

Bromus ciliatus L. Chippewa, Rusk, Price, Lincoln, Marathon: wet places, generally; to be expected here.

Bromus tectorum L. Chippewa, Marathon: dry roadsides, railroads.

Cencrus longispinus (Hackel) Fern. Chippewa, Lincoln: sandy open places.

Elymus diversiglumis Scribn. & Ball (*E. interruptus* Buckl.). Chippewa: sandy powerline right-of-way.

Elytrigia smithii (Rydb.) A. Löve. Clark: "Stanley."

Eragrostis cilianensis (All.) Janchen (*E. megastachya* (Koel.) Link). Clark, Chippewa, Lincoln: sandy roadsides.

Festuca saximontana Rydb. (*F. brachyphylla* var. *rydbergii* (St.-Yves) Cronq. in Gleason & Cronquist (1991)). Lincoln, Price: sandy fields and woods.

Koeleria macrantha (Ledeb.) Schultes (*K. cristata* Pers.; *K. pyramidata* (Lam.) P. Beauv.). Chippewa: railroad right-of-way.

Muhlenbergia uniflora (Muhl.) Fern. Clark: wet sandy soil.

Oryzopsis racemosa (Smith) A. Hitchc. Clark, Chippewa, Lincoln, Marathon: woods.

Panicum boreale Nash (*Dichanthelium boreale* (Nash) Freckmann). Lincoln, Marathon: woods.

Panicum depauperatum Muhl. (*Dichanthelium depauperatum* (Muhl.) Gould). Clark, Lincoln: sandy soil.

Panicum latifolium L. (*Dichanthelium latifolium* (L.) Harvill). Chippewa, Lincoln: woods.

Panicum meridionale Ashe (*Dichanthelium meridionale* (Ashe) Freckmann). Price: sandy open roadside.

Panicum perlongum Nash (*Dichanthelium perlongum* (Nash) Freckmann). Chippewa: railroad right-of-way.

Poa nemoralis L. Price: hemlock-hardwood forest.

Sporobolus heterolepis A. Gray. Chippewa: railroad right-of-way.

Triplasis purpurea (Walter) Chapman. Chippewa: sandy lake terrace.

Vulpia octoflora (Walter) Rydb. (*Festuca octoflora* Walter). Lincoln: railroad right-of-way.

Zizania aquatica L. Marathon: shallow water of drainage ditch.

PONTEDERIACEAE Pickerel-weed or Water-hyacinth Family

Heteranthera dubia (Jacq.) MacMillan (*Zosterella dubia* (Jacq.) Small) WATER STARGRASS. Known from the Mondeaux Flowage and the Medford Millpond (a dammed portion of the Black River). (*1566*, *2710*)

Pontederia cordata L. PICKEREL-WEED. Shallow water of lakes and slow-moving streams; locally common to abundant. (*623*)

POTAMOGETONACEAE Pondweed Family

Potamogeton alpinus Balbis ALPINE or RED PONDWEED. Common in streams, especially those with sandy or gravelly beds, and often in swift current. (*1184*, *1319*, *1435*, *1462*, *1766*, *1788*, *1960*, *2608*)

Potamogeton amplifolius Tuckerman LARGELEAF PONDWEED. Lakes and streams; fairly common. (*1335*, *1432*, *2705*, *2735*)

Potamogeton crispus L. CURLY PONDWEED. Known only from Pine Creek, where common in places. Introduced from Europe. (*1431*)

Potamogeton epihydrus Raf. RIBBONLEAF PONDWEED. Shallows of lakes and ponds; quiet water of streams; in both hard and soft water; common. (*1496*, *1553*, *1651*, *1674*, *2019*, *2588*, *2614*, *2709*, *2747*, *2755*)

Potamogeton foliosus Raf. LEAFY PONDWEED. Lakes and streams; occasional. (*1433*, *1436*, *2625*)

Potamogeton natans L. FLOATING PONDWEED. Ponds, lakes, and slow-moving streams. (*1415*, *1441*)

Potamogeton nodosus Poiret LONGLEAF PONDWEED. Abundant in the Yellow River below the Chequamegon Waters Flowage, in swift current. (*1185*)

Potamogeton oakesianus J. W. Robbins. OAKES' PONDWEED. Known only from St. Claire Lake, where common in shallow water. (*2744*)

Potamogeton obtusifolius Mertens & Koch. BLUNTLEAF PONDWEED. Collected from Anderson Lake in the CNF, where fairly common in shallow water. (*1691*)

Potamogeton praelongus Wulfen WHITESTEM PONDWEED. Known from Rib and Spirit Lakes, in water at least 1 m deep. (*2601*, *2810*)

Potamogeton pusillus L. Two subspecies in our area:

ssp. pusillus) SMALL PONDWEED. Ponds and quiet backwaters of streams; occasional. (*1411*, *1416*, *1434*)

ssp. tenuissimus (Mertens & Koch) Haynes & Hellquist) (*P. berchtoldii* Fieber) BROAD-LEAVED SMALL PONDWEED. Common in lakes and streams. (*1790, 1893, 2706, 2738, 2742, 2762, 2855*)

Potamogeton richardsonii (A. Bennett) Rydb. RICHARDSON'S PONDWEED. Lakes and streams; of local occurrence, but especially abundant in the Chequamegon Waters Flowage. (*2603, 2606, 2758*)

Potamogeton robbinsii Oakes FERN PONDWEED. Lakes; occasional to frequent. (*1493, 2704*)

Potamogeton spirillus Tuckerman NORTHERN SNAILSEED PONDWEED. Common in lakes and slow-moving streams. (*1556, 1565, 1689, 1690, 2422, 2613, 2624*)

Potamogeton vaseyi J. W. Robbins VASEY'S PONDWEED. Locally in quiet waters of ponds and streams. One of our specimens is from a shallow gravel pit pond that periodically dries up; another is from a fairly new pond, dug to obtain road fill. A Wisconsin special concern species. (*722, 1410, 1430, 1827*)

Potamogeton zosteriformis Fern. FLATSTEM PONDWEED. Fairly common in lakes and ponds. (*1412, 1558, 1564, 2779*)

Additional records from adjacent counties:

Potamogeton confervoides Reichb. Lincoln: Bass Lake; mud bottom.

Potamogeton diversifolius Raf. (Incl. *P. capillaceus* Poiret and *P. bicupulatus* Fern.). Chippewa, Lincoln: sand-bottomed lakes.

Potamogeton filiformis Pers. Lincoln: Prairie River, floating free near shore.

Potamogeton friesii Rupr. Lincoln: Musky Lake; silt, 1 m deep.

Potamogeton gramineus L. Chippewa, Lincoln, Rusk: sand-bottomed lakes and large streams.

Potamogeton illinoensis Morong. Rusk: Island Lake.

Potamogeton pectinatus L. Chippewa, Price, Rusk: lakes, 1-5 ft. of water.

SCHEUCHZERIACEAE Arrow-grass Family

Scheuchzeria palustris L. POD-GRASS. In the wetter parts of sphagnum bogs; occasional to frequent. (*2021, 2105, 2403, 2491, 2796*)

SMILACACEAE Catbrier or Greenbrier Family

Smilax ecirrata (Engelm.) S. Watson CARRION-FLOWER. Rich woods, river banks; occasional to frequent. (*1069*)

Smilax lasioneura Hook. (*S. herbacea* var. *lasioneura* (Hook.) DC.) CARRION- FLOWER. Rich woods, riverbottom forests, stream bank thickets; frequent. (*507, 1074, 2144*)

Smilax tamnoides L. (*S. hispida* Muhl.) BRISTLY GREENBRIER. Woods and thickets, especially near streams; frequent. Occasional along railroad tracks. (*1227, 1448*)

Additional records from adjacent counties:

Smilax illinoensis Mangaly. Clark: rich deciduous woods.

SPARGANIACEAE Bur-reed Family

Sparganium americanum Nutt. Lakeshores, stream edges, wet meadows, often in shallow water; frequent. (*775, 1753, 2007, 2418*)

Sparganium androcladum (Engelm.) Morong BRANCHED BUR-REED. Locally abundant in marshy shores of flowages in the Pershing State Wildlife Area. (*1758*)

Sparganium emersum Rehmann (*S. chlorocarpum* Rydb.) In shallow water along the edges of lakes and streams; common. (*1346, 1423, 1629, 1654, 1672, 1765, 1931*)

Sparganium eurycarpum Engelm. GIANT BUR-REED. Marshy shores; local. (*1889*)

Sparganium fluctuans (Morong) Robinson FLOATING BUR-REED. Lakes, in water to 1 m deep; fairly common. With floating leaves. (*332, 1464, 1655, 1730, 1759, 2576, 2803*)

Additional records from adjacent counties:

Sparganium angustifolium Michaux. Lincoln: shallow water of sand-bottomed lakes.

Sparganium natans L. (*S. minimum* (Hartman) Fries) Lincoln, Rusk: shallow water.

TYPHACEAE Cat-tail Family

Typha angustifolia L. NARROW-LEAVED CAT-TAIL. Marshy roadsides; occasional. According to S. Galen Smith (pers. comm.), this is probably a non-native species, introduced

early to the East Coast from Europe but significantly expanding its range only in recent decades. (*353*, *1292*)

Typha latifolia L. COMMON CAT-TAIL. Abundant in marshes, wet bogs, ditches, lakeshores, ponds, streamsides, and other wet or seasonally wet places. (*846*)

A hybrid of *T. latifolia* and *T. angustifolia*, called *Typha* × *glauca* Gordon, is common and widespread in Wisconsin. Though known from Chippewa and Marathon Counties, it has not been documented from Taylor County, as yet.

XYRIDACEAE Yellow-eyed-grass Family

Xyris montana Ries YELLOW-EYED-GRASS. Known only from a very wet bog mat bordering a small lake in the CNF, but quite common at this location. (*2406*, *2930*)

ZANNICHELLIACEAE Horned Pondweed Family

Additional records from adjacent counties:

Zannichellia palustris L. Lincoln: ponds and lakes. Rather local in Wisconsin, but to be expected in Taylor County.

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On the cover: Old-growth hemlock-hardwood-white pine remnant: Gerstberger Pines, a special use area near Rib Lake owned by Taylor County